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GUIDE TO THE EVALUATION OF HUMAN EXPOSURE TO NOISE FROM LARGE WIND TURBINES

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noise situation.

4.3.3 Building Vibration Evaluation.- The evaluation of the response to noise-induced building vibration is determined from figure 11, which uses an assumed one-third octave band wind turbine noise spectrum for illustrative purposes. The outside noise spectrum associated with the turbine operations can induce vibrations of the windows, walls and floors (Appendix C and refs. 13 and 14) as illustrated. The recommended design goal is that the response of the walls be below the human perception threshold, or below the ambient perceptible vibration.

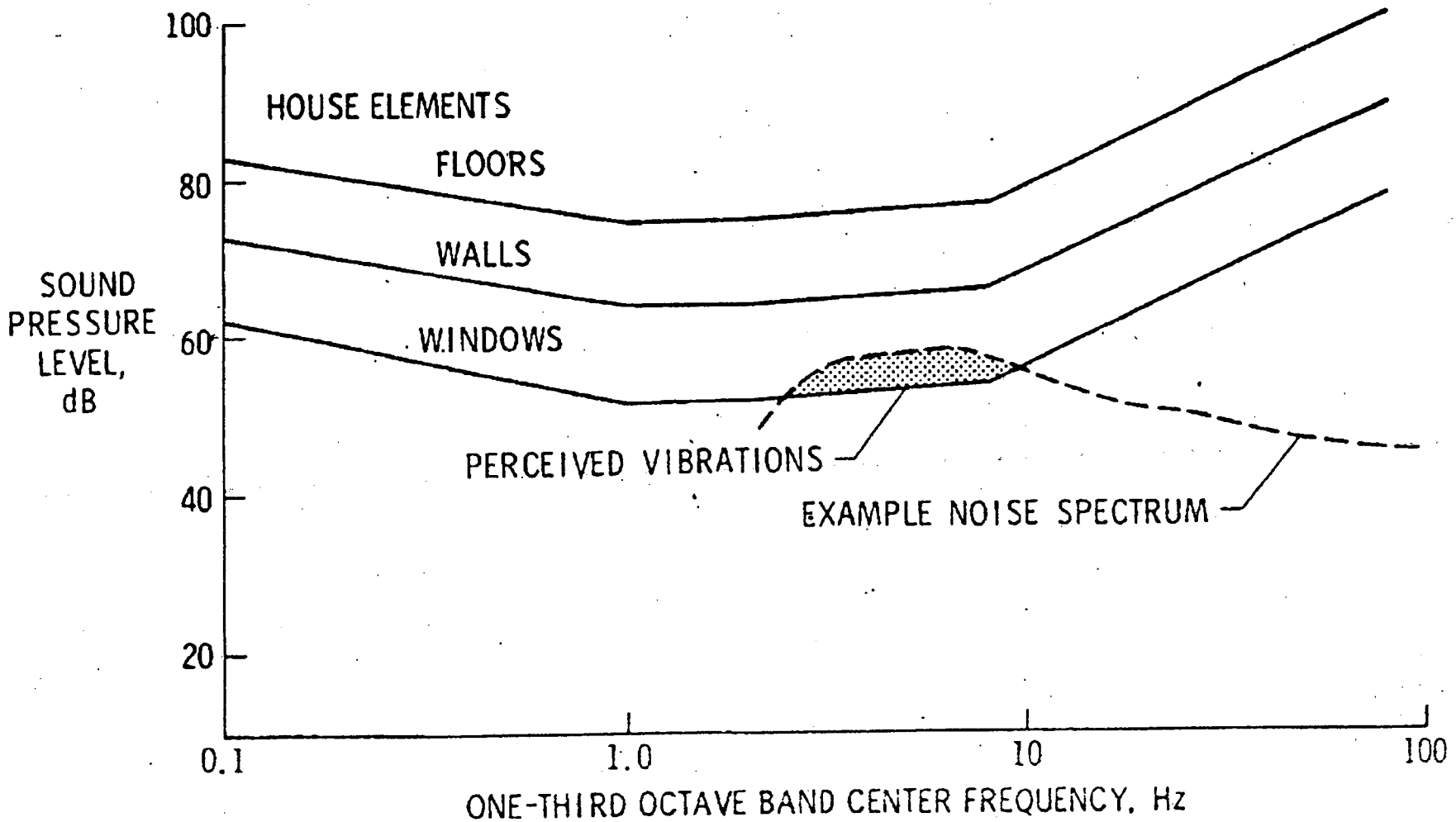
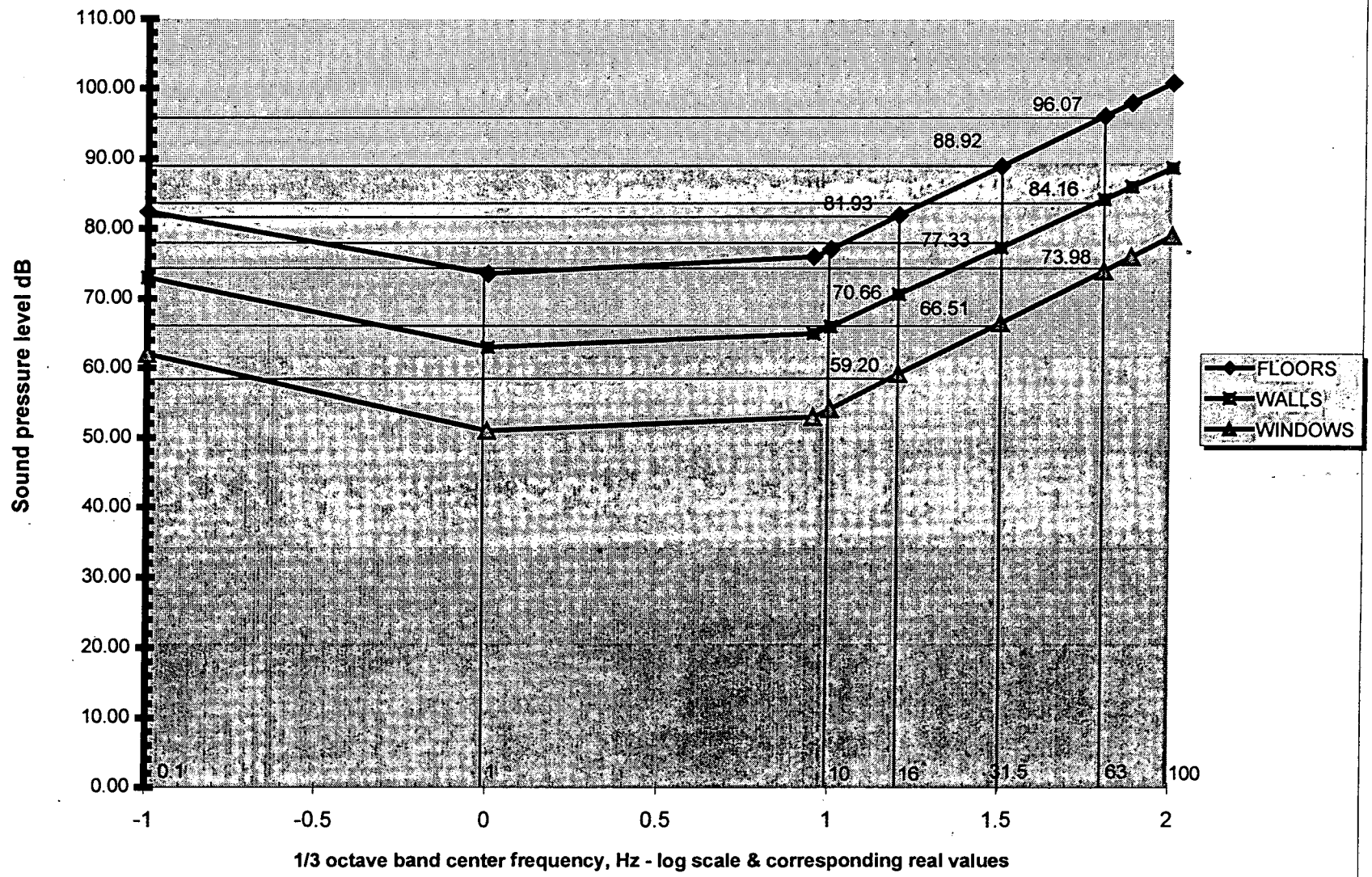


Figure 11.- Sound pressure levels sufficient to cause perceptible vibrations of house structure elements over a range of frequencies.

Sound pressure levels sufficient to cause perciptible vibrations of house structure elements over a range of frequencies



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HANDBOOK OF ACOUSTICS

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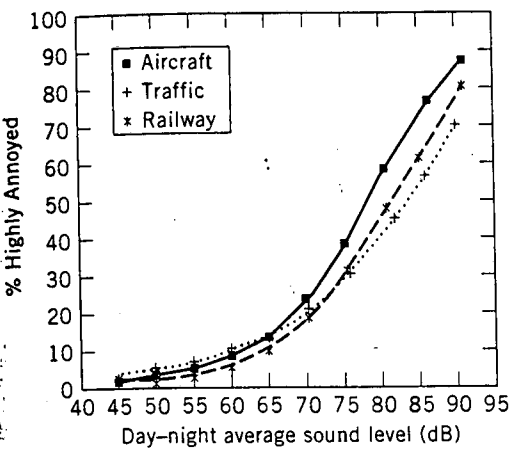

Fig. 18 Curves representing the percentage of subjects that are highly annoyed by noise against day–night average sound level DNL for different sources: —■— aircraft, · · ·+· · · traffic, and –*– railway. Curves based on data from Fidell et al.[60] (From Ref. 58 with permission.)

noise, then it may be that aircraft noise is more annoying than surface transportation noise for reasons such as the greater variation in level with time and the different frequency spectra from other types of transportation noise sources. As already discussed in the text accompanying Fig. 14 in Section 14, aircraft noise does generally exhibit a much greater variation in level from traffic noise and other sources of surface transportation. If such variation is indeed more annoying and is one of the main causes of the difference in annoyance caused by these different forms of transportation noise, this suggests that it may be advisable to re-examine such measures that account for variation in level such as the traffic noise index TNI or the noise pollution level NPL discussed in Sections 13.1 and 13.2.

16 NOISE CRITERIA AND NOISE REGULATIONS

Using some of the noise measures and descriptors discussed and surveys and human response studies, various criteria have been proposed so that noise environments can be determined that are acceptable for people, for speech communication, for different uses of buildings, for sleep and for different land uses. In some countries such criteria are used to write noise regulations for new machinery, vehicles, traffic noise, railroad noise, aircraft and airport noise, community noise, and land use and planning, etc. It is beyond the scope of this chapter to give a comprehensive summary of all these criteria and regulations. Instead just a few are described in this section. The interested reader is referred to the chapters fol-

TABLE 2 Recommended Values of NCB Curves for Different Uses of Spaces in Buildings[a]

Type of Space (and Acoustical Requirements)	NCB Curve	Approximate L_A, dB
Broadcast and recording studios	10	18
Concert halls, opera houses, and recital halls	10–15	18–23
Large auditoriums, large drama theaters, and large churches	<20	28
Broadcast, television, and recording studios	<25	33
Small auditoriums, small theaters, small churches, music rehearsal rooms, large meeting and conference rooms	<30	38
Bedrooms, sleeping quarters, hospitals, residences, apartments, hotels, motels, etc.	25–40	38–48
Private or semiprivate offices, small conference rooms, classrooms, and libraries	30–40	38–48
Living rooms and drawing rooms in dwellings	30–40	38–48
Large offices, reception areas, retail shops and stores, cafeterias and restaurants	35–45	43–53
Lobbies, laboratory work spaces, drafting and engineering rooms, and general secretarial areas	40–50	48–58
Light maintenance shops, industrial plant control rooms, office and computer equipment rooms, kitchens and laundries	45–55	53–63
Shops, garages, etc. (for just acceptable speech and telephone communication)	50–60	58–68
For work spaces where speech or telephone communication is not required, but where there must be *no risk* of hearing damage	55–70	63–78

Source: Based in part on Ref. 13.

[a] Also given are the approximate equivalent A-weighted sound levels L_A.

lowing in Part VIII and to Refs. 25, 28, and 62 for more complete summaries of criteria, regulations, and legislation. For instance, Chapter 71, provides information on limits for the noise of new vehicles in different countries (where acceleration noise tests are used). Such limits are based on results such as those presented in Fig. 4.

16.1 Noise Criteria

An example of noise criteria is given in Table 2, which is based on those suggested by Beranek[13] and gives recommended NCB curve values (and approximate A-weighted levels) for various indoor functional activity areas. The NCB curves are given in Fig. 10. For example, the air-conditioning unit chosen to supply air to bedrooms (used in residences, apartments, hotels, hospitals, etc.) should have a spectrum corresponding to no more than an NCB curve of 25–40 (or an A-weighted sound level of no more than about 38–48 dB).

Another example of noise criteria are the guidelines recommended by EPA,[27] WHO,[64] FICON,[29] and various European road traffic regulating bodies. See Table 3. As already mentioned L_{eq} is very widely used to evaluate road traffic, railroad, and even aircraft noise.[25] Interestingly, railroad noise has been found to be less annoying than traffic noise in several surveys.[25,68,69] This has resulted in noise limits (using L_{eq}) that are 5 dB lower for railroad noise than road traffic noise in Austria, Denmark, Germany, and Switzerland and 3 dB lower in The Netherlands.[25] Gottlob terms this difference the "railway bonus."[25] This seems to contradict the results shown in Fig. 18 and suggests the need for further research.

An example of national noise exposure criteria is the guidance given in the recent British government guidelines adopted in 1994 for land development given in Table 4. This table shows guidelines in A-weighted sound levels L_{eq} for four noise exposure categories.[70] The noise exposure categories can be interpreted as

TABLE 3 Guidelines from EPA,[27] WHO,[64] FICON,[29] and Various European Agencies for Acceptable Noise Levels

Authority	Specified Sound Levels	Criterion
EPA Levels Document[27]	$L_{dn} \le 55$ dB (outdoors) $L_{dn} \le 45$ dB (indoors)	Protection of public health and welfare with adequate margin of safety
WHO Document (1995)[64]	$L_{eq} \le 50/55$ dB (outdoors; day) $L_{eq} \le 45$ dB (outdoors; night) $L_{eq} \le 30$ dB (bedroom) $L_{max} \le 45$ dB (bedroom)	Recommended guideline values
U.S. Interagency Committee (FICON)[29]	$L_{dn} \le 65$ dB $65 \le L_{dn} \le 70$ dB	Considered generally compatible with residential development Residential use discouraged
Various European road traffic regulations[25]	$L_{eq} \ge 65$ or 70 dB (day)	Remedial measures required

Source: Based on Ref. 28.

TABLE 4 Guidelines Used in the United Kingdom for A-Weighted Equivalent Sound Levels for Different Noise Exposure Categories

Noise Source		Noise Exposure Category			
		A	B	C	D
Road traffic	(07.00–23.00)	<55	55–63	63–72	>72
	(23.00–07.00)	<45	45–57	57–66	>66
Rail traffic	(07.00–23.00)	<55	55–66	66–74	>74
	(23.00–07.00)	<45	45–59	59–66	>66
Air traffic	(07.00–23.00)	<57	57–66	66–72	>72
	(23.00–07.00)	<48	48–57	57–66	>66
Mixed sources	(07.00–23.00)	<55	55–63	63–72	>72
	(23.00–07.00)	<45	45–57	57–66	>66

Source: Based on Ref. 70.

follows[71]: (a) Noise need not be considered as a determining factor in granting planning permission, although the noise level at the high end of the category should not be regarded as a desirable level; (b) noise should be taken into account when determining planning applications, and where appropriate, conditions should be imposed to ensure an adequate level of protection against noise; (c) planning permission should not normally be granted; where it is considered that permission should be given, for example because there are no alternative quieter sites available, conditions should be imposed to ensure a commensurate level of protection against noise; (d) planning permission should normally be refused.

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sachusetts, requires that construction sound levels not exceed an L_{10}(20 min) of 75 dB(A) at nearest residential property.[6]

3 RATINGS USED TO ASSESS THE ACCEPTABILITY OF AMBIENT SOUND

3.1 Day–Night Average Sound Level

The *day–night average sound level* (DNL; symbol, L_{dn}) is a 24-h average A-weighted sound level where a 10-dB "penalty" is applied to sound occurring between the hours of 10:00 p.m. and 7:00 a.m. The 10-dB penalty accounts for the heightened sensitivity of a community to noise occurring at night. This descriptor is also discussed in Section 10 of Chapter 64 of named day–night equivalent level. Day–night average sound level has become the primary descriptor for general environmental sound and is often used to assess sound from transportation systems. Among agencies using the day–night average sound level in their criteria and regulations are the U.S. Environmental Protection Agency (EPA),[7] the Federal Aviation Administration (FAA),[8] and the U.S. Department of Housing and Urban Development (HUD).[9]

The U.S. EPA has taken the lead among all federal agencies in unifying usage of environmental sound level descriptors. The EPA has fostered the development of the day–night average sound level but has not enacted regulations controlling general environmental noise. Instead, it has issued guidelines that identify yearly L_{dn} sound levels "sufficient to protect public health and welfare from the effects of environmental noise." Table 1 presents EPA's suggested levels to protect public health and welfare. The EPA specifically cautions that these tabulated levels are not to be used as regulations by other agencies without addressing economic and other considerations associated with sound level restrictions. Of these levels, the most widely cited are a day–night average sound level of 55 dB for outdoor residential areas and a day–night average sound level of 45 dB for indoor residential spaces. Again, these are only to be used as levels with a margin of safety incorporated and not as EPA's recommendations for agency limits.

3.2 Community Noise Equivalent Level

The *community noise equivalent level* (CNEL) is similar to the DNL (L_{dn}) except that, in addition to the 10-dB(A) penalty applied between the hours of 10:00 p.m. to 7:00 a.m., there is a 5-dB(A) penalty applied to sound between the hours of 7:00 p.m. and 10:00 p.m. CNEL is defined in Chapter 64. Use of this descriptor seems to be declining nationally, but is most commonly used in California standards, where it is allowed as an alternative environmental sound level descriptor to the day–night average sound level for assessing environmental sound transmission into building spaces.[10,11] It is also used to assess community noise in particular near airports (Chapter 70).

3.3 Noise Criterion Curves

Speech interference level and loudness level are not widely used to evaluate ambient sound in engineering acoustics. More widely used descriptors are noise criterion (NC) curves. Noise criterion curves are a simpler alternative to the evaluation of perceived loudness than the loudness level computation procedure. NC curves are also discussed in Section 8 of Chapter 64. Figure 2 contains the set of NC curves.[12] The NC curves are smoothed versions of the loudness level index curves. The NC value shown for each curve is the

TABLE 1 Yearly L_{dn} Values That Protect Public Health and Welfare with a Margin of Safety

Effect	Level	Area
Hearing	$L_{eq(24)} \leq 70$ dB	All areas (at the ear)
Outdoor activity interference and annoyance	$L_{dn} \leq 55$ dB	Outdoors in residential areas and farms and other outdoor areas where people spend widely varying amounts of time and other places in which quiet is a basis for use.
	$L_{eq(24)} \leq 55$ dB	Outdoor areas where people spend limited amounts of time, such as school yards, playgrounds, etc.
Indoor activity interference and annoyance	$L_{dn} \leq 45$ dB	Indoor residential areas
	$L_{eq(24)} \leq 45$ dB	Other indoor areas with human activities such as schools, etc.

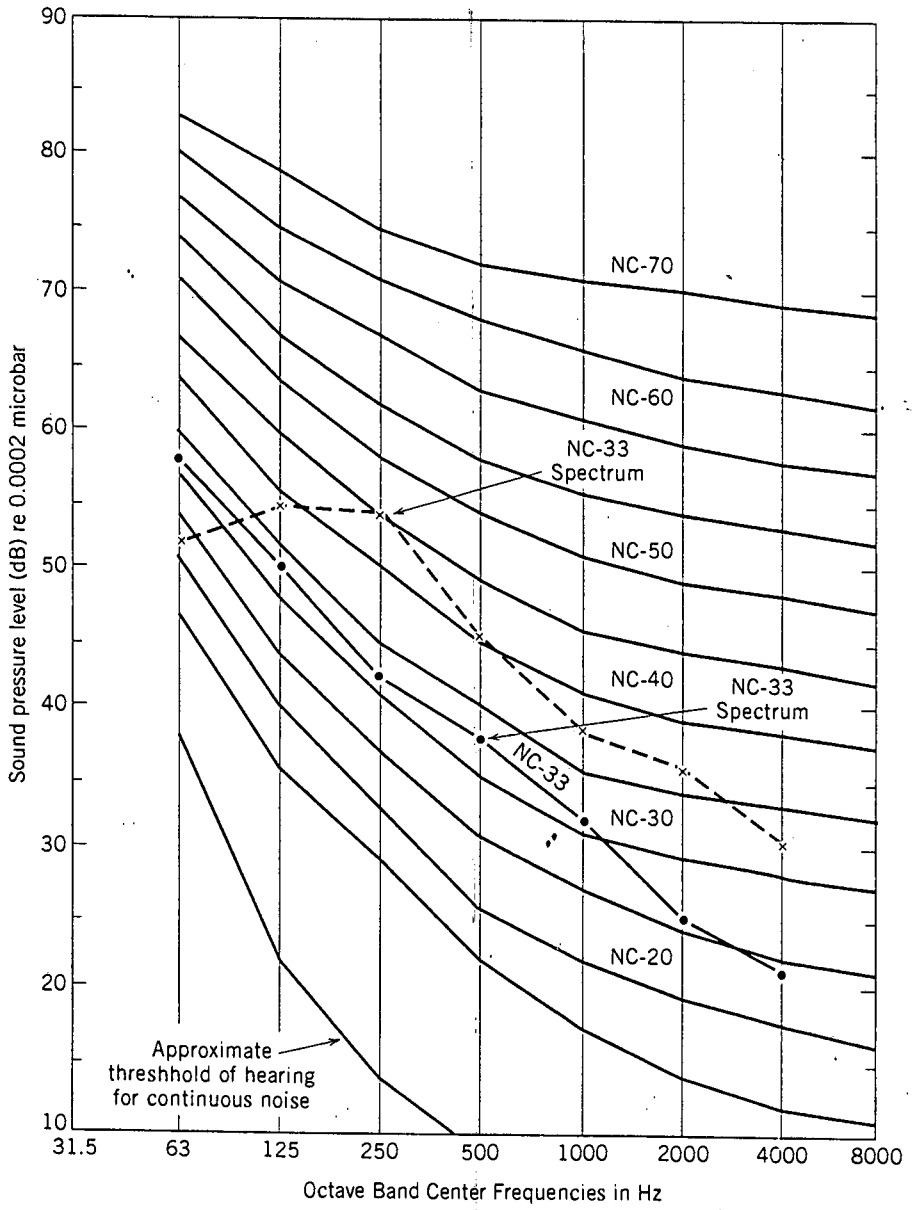

Fig. 2 Noise criterion curves.

SIL (600–1200, 1200–2400, and 2400–4800 Hz), that is, in the "old" octave bands, for each curve. Noise criterion values are commonly determined for an octave band spectrum of sound by superposing the NC curves over the spectrum. The highest NC curve reached by the measured spectrum (tangent to) is the NC rating of the sound pressure level spectrum. Figure 2 shows two typical spectra and the resulting NC values.

Note that the NC curves are defined in terms of the "old" frequency bands 20–75, 75–50, 50–300 cps, and so on. Schultz[13] simply overlaid the "new" preferred octave bands on the NC curves previously defined in old octave bands, added an NC-15 curve, and corrected the approximate threshold of hearing curve originally shown with the NC curves when they were first published. This "updating" of NC curve assessment has not changed the method for evaluating the NC value of a sound pressure spectrum plotted in preferred octave bands.

Often, the NC value of a spectrum is considered within a limited frequency range, such as 500–4000 Hz in the case of concerns for speech intelligibility or 63–125 Hz in the case of low-frequency "rumble"-type sound levels, typically associated with heating, ventilation, and air conditioning (HVAC) systems.

It should also be noted that NC curves are generally used in evaluating continuous sound inside building spaces produced by mechanical systems or environmental sound transmitted into building spaces. Guidelines for assessing the acceptability of sound in buildings generally presume that the background sound does not have tonal or temporal characteristics that lend a distinctive feature to sound, such as transformer hum or fan blade passage tones. Using these criteria to evaluate tonal noise may not be appropriate as it may underestimate the interference of sound on occupant use of spaces.

In the United States background sound in building spaces produced by mechanical systems is not limited by any specific regulation or agency. Instead, the building design profession has, through various organizations, established design criteria for noise in architectural spaces. The most commonly used criteria are the design guidelines for HVAC system noise in unoccupied spaces established by the American Society of Heating, Refrigerating, and Air-Conditioning Engineers (ASHRAE). For most of the many years that ASHRAE has published recommended design criteria for spaces, it has expressed them as acceptable ranges of NC curves.

In recent years, ASHRAE has introduced a new set of curves called room criterion (RC) curves, which are discussed below. On their first introduction, ASHRAE publications suggested that RC curves could be used in lieu of NC curves. As the years progressed, the use of RC curves was cited as preferred to the use of NC curves. Finally, the *1995 ASHRAE Applications Handbook* lists recommended ranges of background sound in building spaces expressed only as ranges of RC(N) curves (Ref. 14, p. 43.5). No listing of criteria using NC curves is given in the *1995 Handbook* except that the guidelines state that "if the quality of the sound in the space is of secondary concern, the criteria may be specified in terms of NC levels" (footnote b in Table 2, p. 43.5). Although RC curves represent a better quality of background sound, NC curves are still in wider use at this time as they represent an acceptable compromise between economy and quality of background sound. Table 2 presents the ASHRAE recommended design guidelines for HVAC system noise in unoccupied spaces. These are expressed in RC(N) levels. For use with NC curves, substituting NC levels equal to the RC levels shown is acceptable, subject to the cautionary footnotes in Table 2.

3.4 Room Criterion Curves

ASHRAE has adopted the use of room criterion (RC) curves for evaluating the background sound in building spaces produced by mechanical systems. RC curves are also described in Section 8 of Chapter 64. Unlike NC curves, RC curves are straight lines, as shown in Fig. 3. These curves are used by superposing them on a measured octave band spectrum. The RC value of the spectrum is determined through the following procedure:

1. Determine the arithmetic average, to the nearest whole number, of the sound pressure levels in the 500-, 1000-, and 2000-Hz octave frequency bands. This is the RC level associated with the room sound level spectrum.
2. Draw a line having a −5 dB/octave slope through the RC level at 1000 Hz determined from step 1.
3. Classify the subjective quality or character of the room sound level spectrum as follows:
   a. *Neutral.* A spectrum classified as neutral is free of tonal quality and would be perceived as unobtrusive or bland. A neutral sound spectrum falls exactly along or close to a single RC contour. If the octave band data do not exceed the RC curve determined in step 2 by more than 5 dB at and below 500 Hz and do not exceed the RC curve by more than 3 dB at and above 1000 Hz, the spectrum is considered neutral, and the designator (N) is placed after the RC level.
   b. *Rumble.* A sound spectrum that is perceived to have a "rumbly" quality has an excess of low-frequency sound energy. A rumbly spectrum is characterized as one with octave band sound levels that exceed the RC curve determined in step 2 by more than 5 dB at and below 500 Hz. For such spectra the designator (R) is placed after the RC level.
   c. *Hiss.* A sound spectrum that is perceived to have a "hissy" quality has an excess of high-frequency energy. A hissy spectrum is characterized as one with octave band sound levels that exceed the RC curve determined in step 2 by more than 3 dB above 500 dB. For such spectra the designator (H) is placed after the RC level.
   d. *Acoustically Induced Perceptible Vibration.* The cross-hatched region of the RC curves in Fig. 3 indicates sound pressure levels in the 16- to 63-Hz octave bands at which perceptible vibration in building walls and ceilings can occur. These sound levels often produce rattles in cabinets, doors, pictures. lighting fixtures, and so forth.

TABLE 2 Design Guidelines for HVAC System Noise in Unoccupied Spaces

Space	RC(N) Level[a, b]
Private residences, apartments, condominiums	25–35
Hotels/Motels	
Individual rooms or suites	25–35
Meeting/banquet rooms	25–35
Halls, corridors, lobbies	35–45
Service/support areas	35–45
Office buildings	
Executive and private offices	25–35
Conference rooms	25–35
Teleconference rooms	25 (max)
Open plan offices	30–40
Circulation and public lobbies	40–45
Hospitals and clinics	
Private rooms	25–35
Wards	30–40
Operating rooms	25–35
Corridors	30–40
Public areas	30–40
Performing arts spaces	
Drama theaters	25 (max)
Concert and recital halls	— [c]
Music teaching studios	25 (max)
Music practice rooms	35 (max)
Laboratories (with fume hoods)	
Testing/research, minimal speech communication	45–55
Research, extensive telephone use, speech communication	40–50
Group teaching	35–45
Churches, mosques, synagogues	25–35
With critical music programs	—[c]
Schools	
Classrooms up to 750 ft^2	40 (max)
Classrooms over 750 ft^2	35 (max)
Lecture rooms for more than 50 (unamplified speech)	35 (max)
Libraries	30–40
Courtrooms	
Unamplified speech	25–35
Amplified speech	30–40
Indoor stadiums and gymnasiums	
School and college gymnasiums and natatoriums	40–50[d]
Large seating capacity spaces (with amplified speech)	45–55[d]

[a] The values and ranges are based on judgment and experience, not on quantitative evaluations of human reactions. They represent general limits of acceptability for typical building occupancies. Higher or lower values may be appropriate and should be based on a careful analysis of economics, space usage, and user needs. They are not intended to serve by themselves as a basis for a contractual requirement.

[b] When the quality of sound in the space is important, specify criteria in terms of RC(N). If the quality of the sound in the space is of secondary concern, the criteria may be specified in terms of NC levels.

[c] An experienced acoustical consultant should be retained for guidance on acoustically critical spaces (below RC 30) and for all performing arts spaces.

[d] Spectrum levels and sound quality are of lesser importance in these spaces than overall sound levels.

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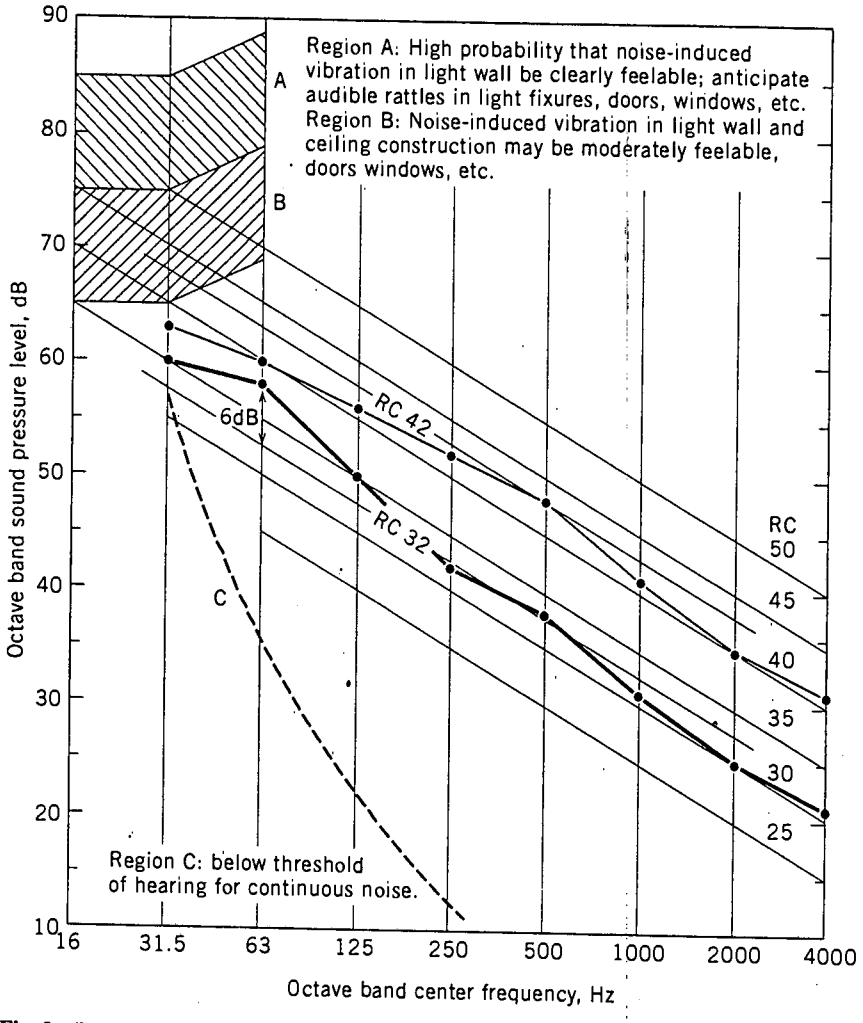


Fig. 3 Room criterion curves plus examples of RC 42(N) and RC 32(R) sound level spectra. (Reprinted with permission from the *1995 ASHRAE Handbook—HVAC Applications.*

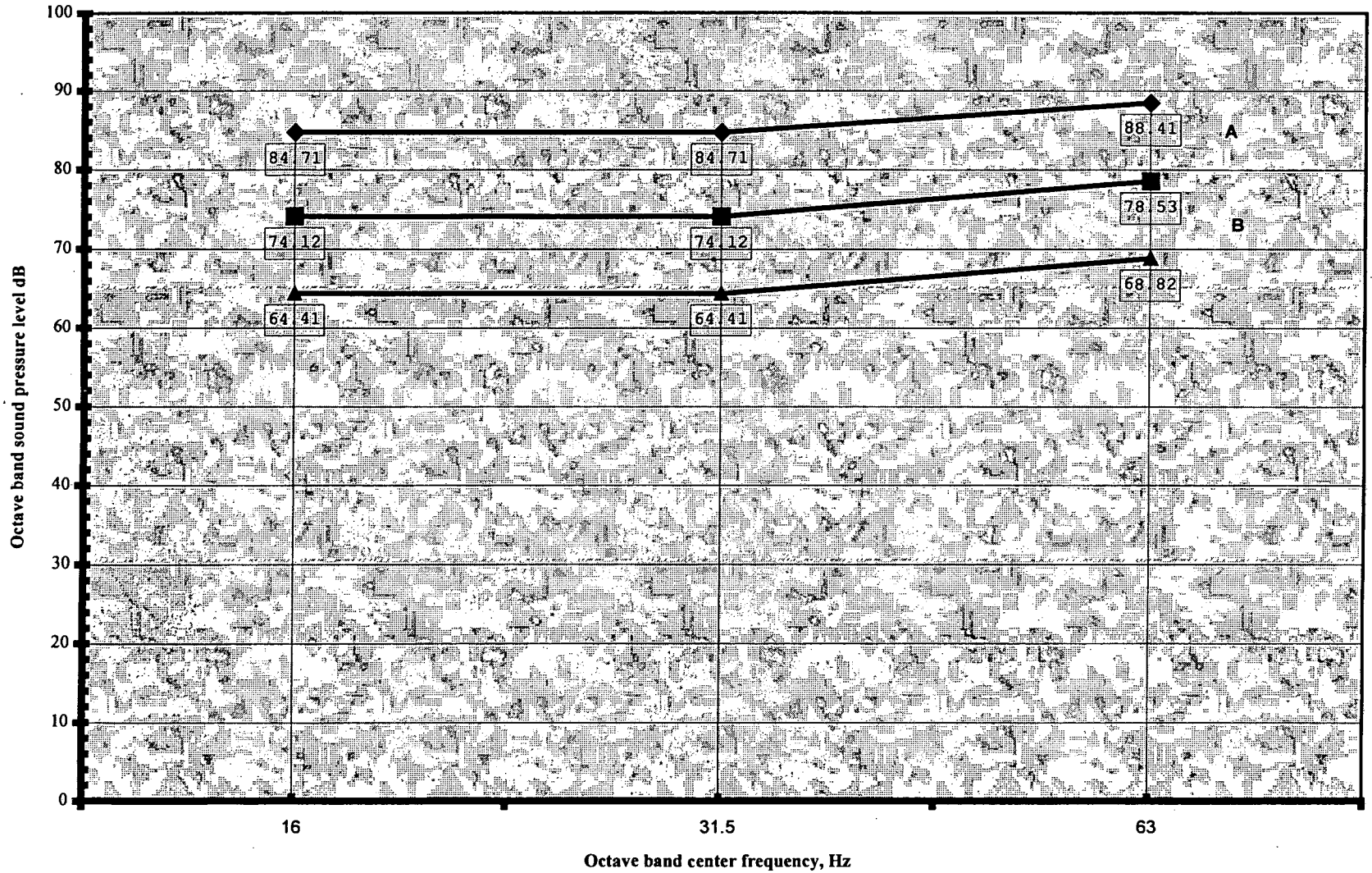
For spectra with levels that fall into this range, the designator (RV) is placed after the RC level.

Figure 3 also provides examples of two types of spectra. In one case, the spectrum follows along the RC 42 curve (i.e., the average of the sound pressures in the 500-, 1000-, and 2000-Hz octave bands is 42 dB). In this spectrum, all of the octave band levels are within the prescribed limits, and is therefore designated an RC 42(N) spectrum. The spectrum labeled RC 32(R) is generally 10 dB lower than the RC 42(N) spectrum, except in the low frequencies where the 63-Hz octave band exceeds the RC 32 contour by 6 dB, thus constituting a low-frequency rumble component.

3.5 Balanced Noise Criterion Curves

Beranek[15,16] has drawn upon low-frequency hearing considerations to extend NC curves down to low frequencies. He has also sloped downward the high-frequency ends of the NC curves to reduce the subjectively hissy nature of sound spectra that conform to NC spectra shapes, thereby creating a "balanced" spectrum subjectively perceived as more uniform and devoid of significant tonal content. A set of balanced noise criterion curves (NCBs) are presented in Fig. 4. NCB curves are also discussed in Section 8 of Chapter 64. As with RC curves, NCB curves are accompanied by a procedure for assessing the perceived balance of a sound spectrum, that is, whether or not a spectrum will be perceived as rumbly

Region A: High probability of noise induced feelable vibration in light wall and audible rattles in light fixtures, doors, windows, etc.
Region B: Moderate probability of noise induced vibration in light wall, ceiling construction, doors, windows, etc



LOW FREQUENCY NOISE INDUCED VIBRATION GUIDELINES FOR HOUSE STRUCTURAL ELEMENTS

NASA-TM-83288 Guidelines

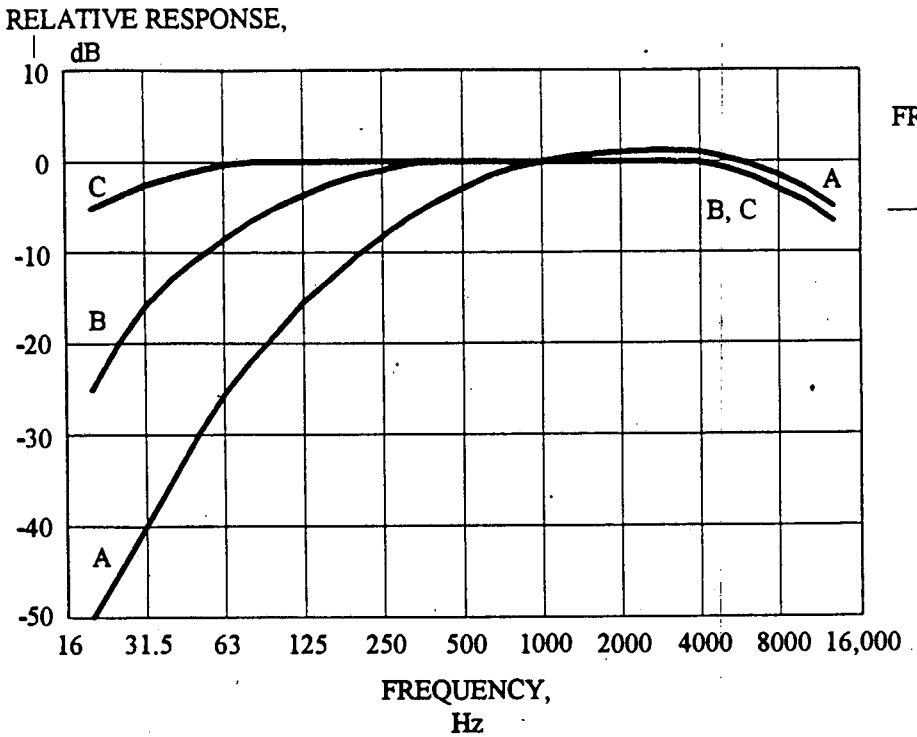
	16 HZ	31.5 Hz	63 Hz
Floors	81.9 dB	88.9 dB	96.0 dB
Walls	70.6 dB	77.3 dB	84.1 dB
Windows	59.2 dB	66.5 dB	73.9 dB

ASHREA Guidelines

	16 HZ	31.5 Hz	63 Hz
High Region A	84.7 dB	84.7 dB	88.4 dB
High Region A min	74.1 dB	74.1 dB	78.5 dB
Moderate Region B	64.4 dB	64.4 dB	68.8 dB

Suggested MDE Low frequency Noise Limits

16 Hz	31.5 Hz	63 Hz
dB	dB	dB
dBA	dBA	dBA



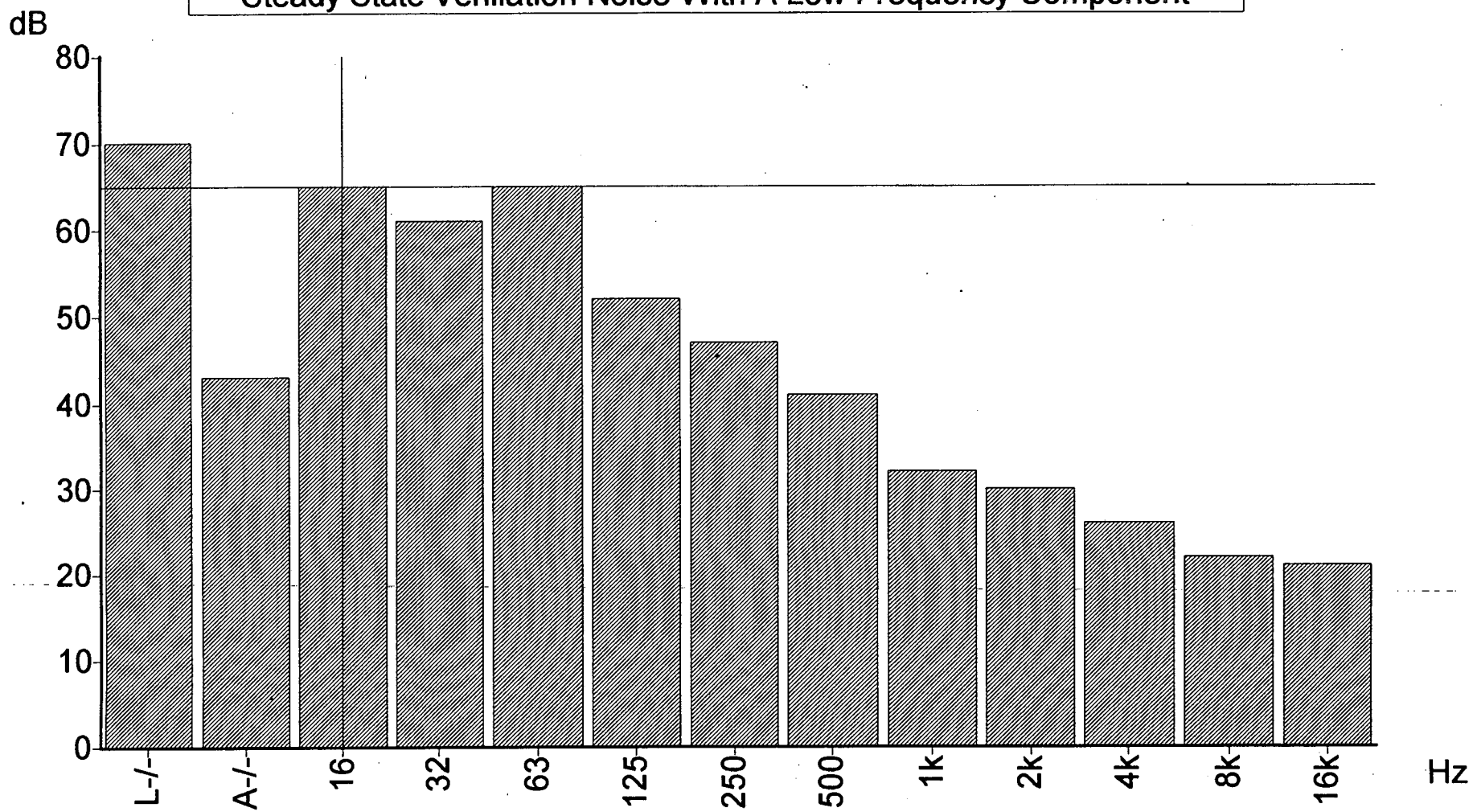
OCTAVE FREQUENCY BAND, Hz	A-WEIGHTED FILTER RESPONSE, dB
31.5	-39
63	-26
125	-16
250	-9
500	-3
1000	0
2000	+1
4000	+1
8000	-1

* 16 -56

This material is reproduced with permission from the American National Standard "Specification for Sound Level Meters" S1.4-1983 (ASA 47) by the American National Standards Institute, copies of which may be purchased from PBD, Inc., Acoustical Society of America Standards Distribution Center, P. O. Box 6996, Alpharetta, GA 30239-6996.

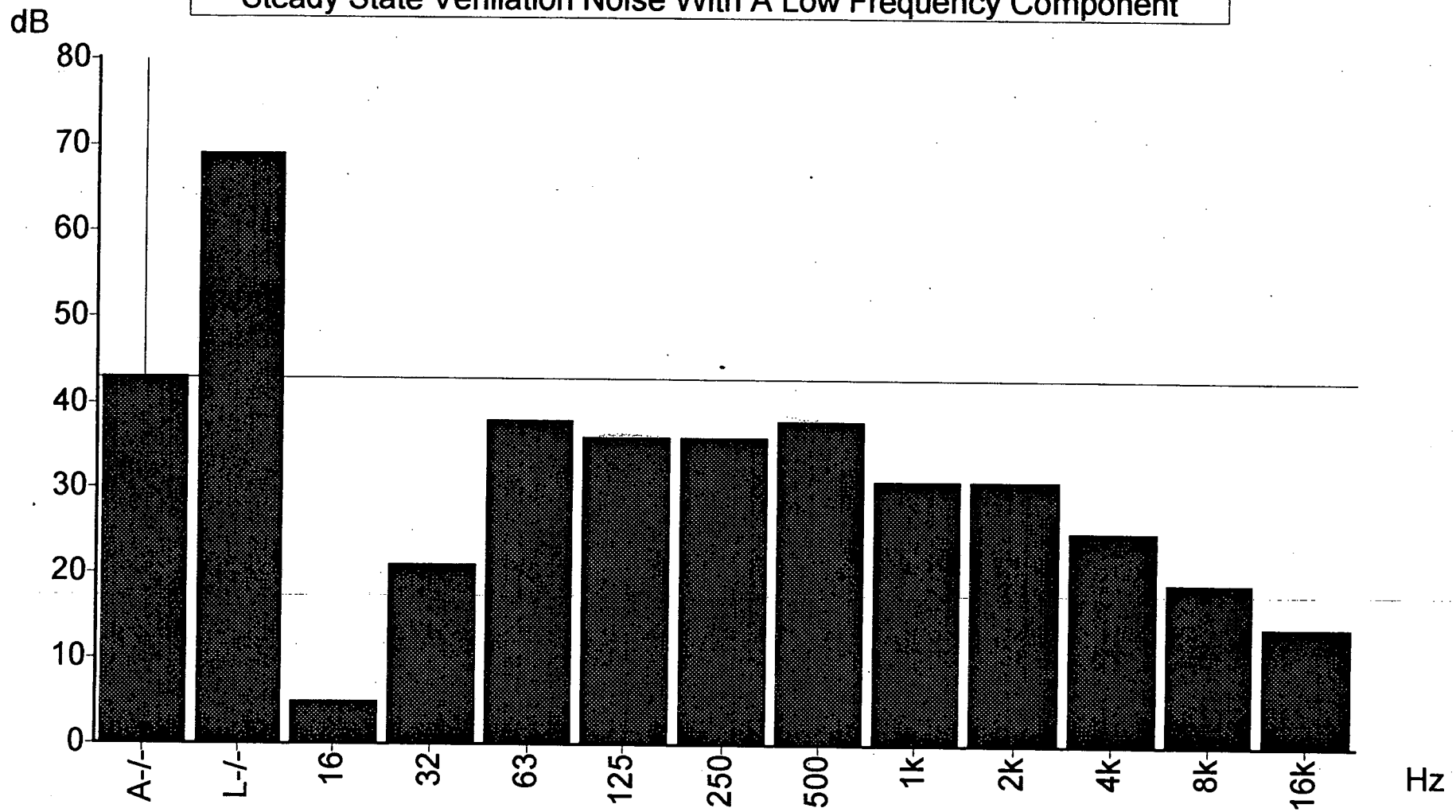
Figure 1-1. Approximate electrical frequency response of the A-, B-, and C-weighted networks of sound level meters.

Steady State Venilation Noise With A Low Frequency Component

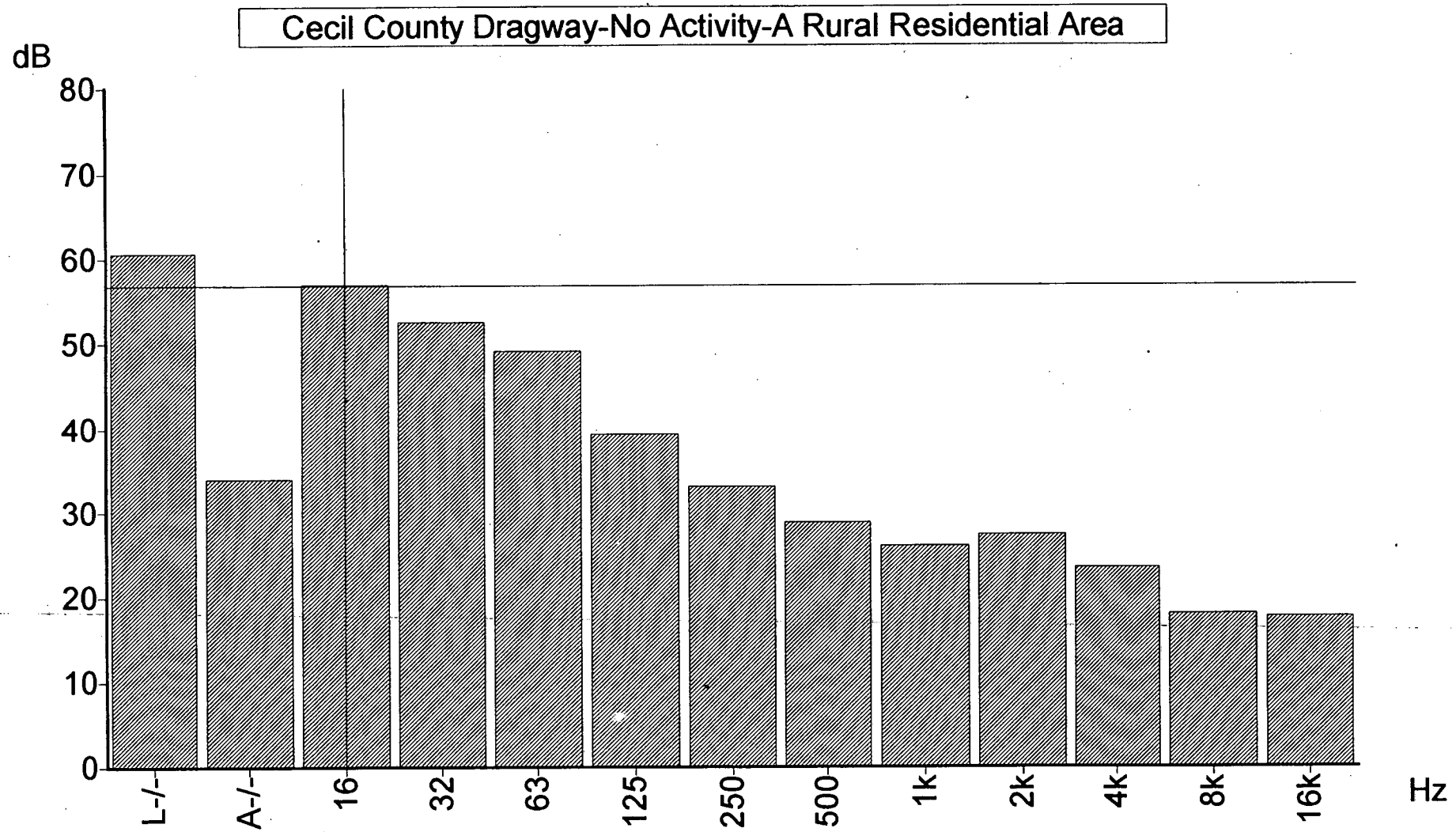


C:\DB2\F0000005.DTA
Function = LN10.0% F
Record start = 02/23/2001 08:07:08
Duration = 000 00:00:25.3
Record = Cumulative
Flags: ----
Cursor: Band = 16 Hz, Frequency weighting = L, Level = 65.0 dB

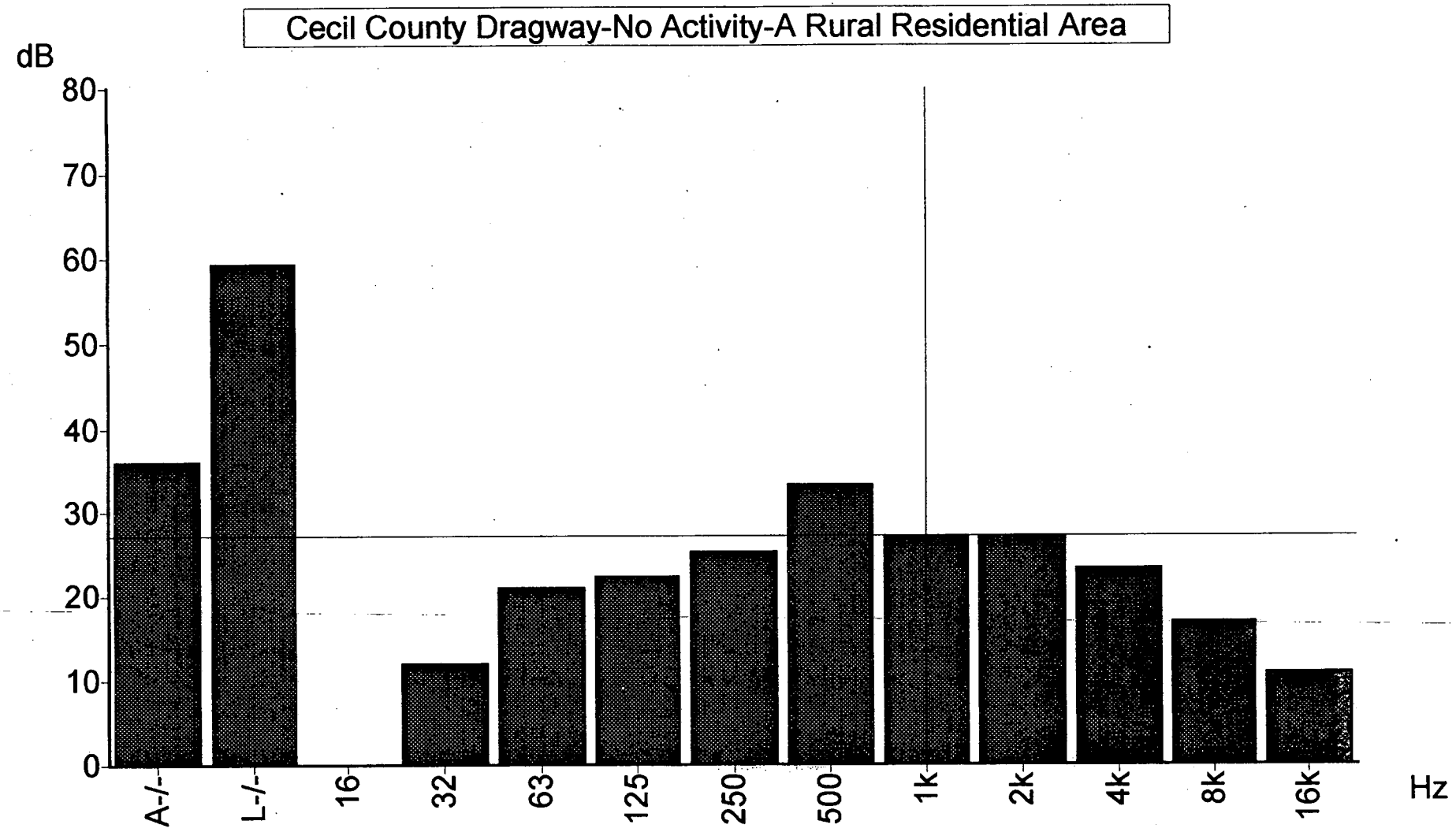
Steady State Venilation Noise With A Low Frequency Component



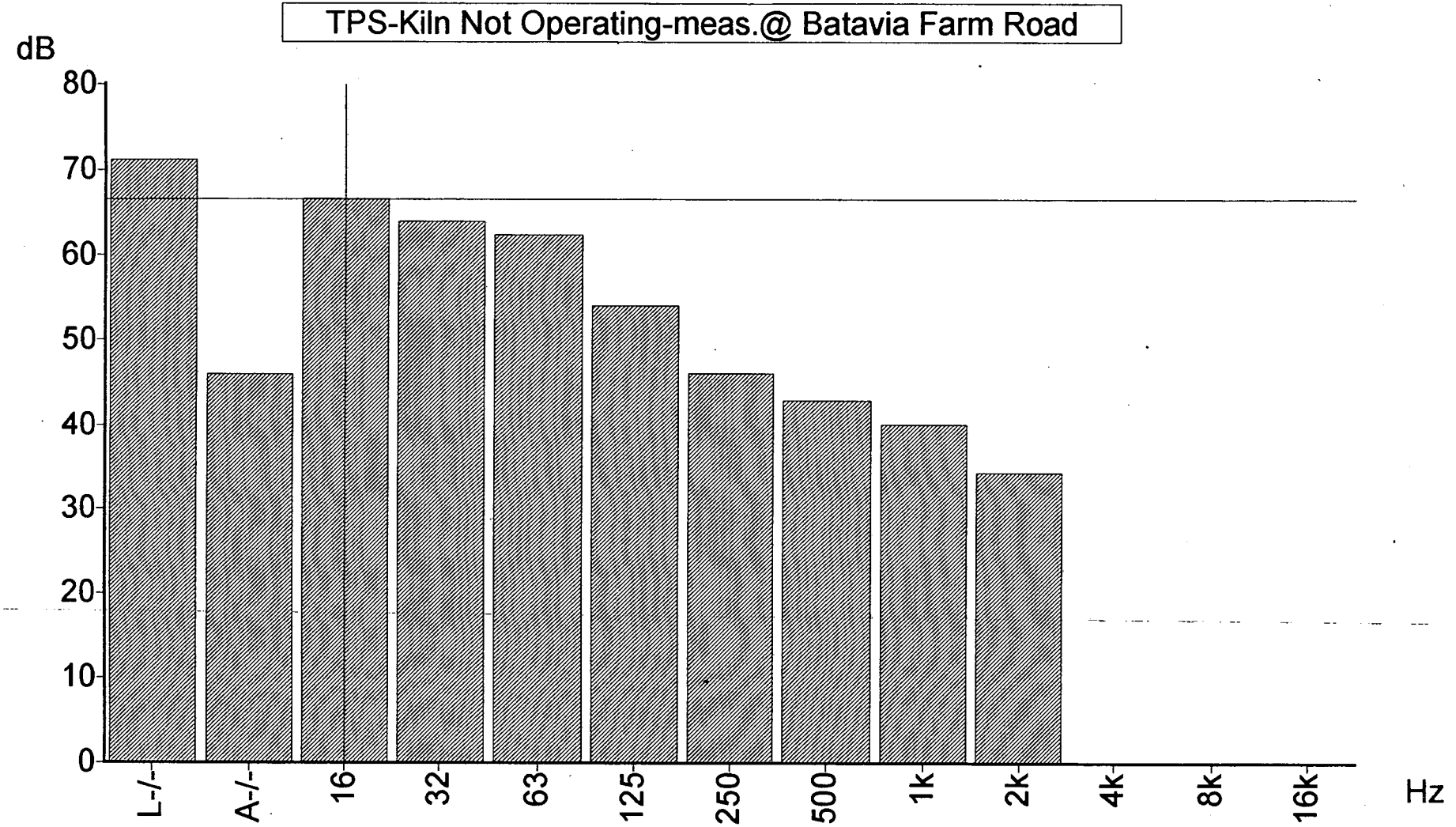
C:\DB2\F0000005.DTA
Function = LN10.0% F
Record start = 02/23/2001 08:08:11
Duration = 000 00:00:27.5
Record = Cumulative
Flags: ----
Cursor: Band = Broadband, Frequency weighting = A, Level = 43.0 dB



C:\DB2\F0000005.DTA
Function = Leq
Record start = 02/27/2001 13:38:18
Duration = 000 00:00:31.4
Record = Cumulative
Flags: ----
Cursor: Band = 16 Hz, Frequency weighting = L, Level = 56.9 dB



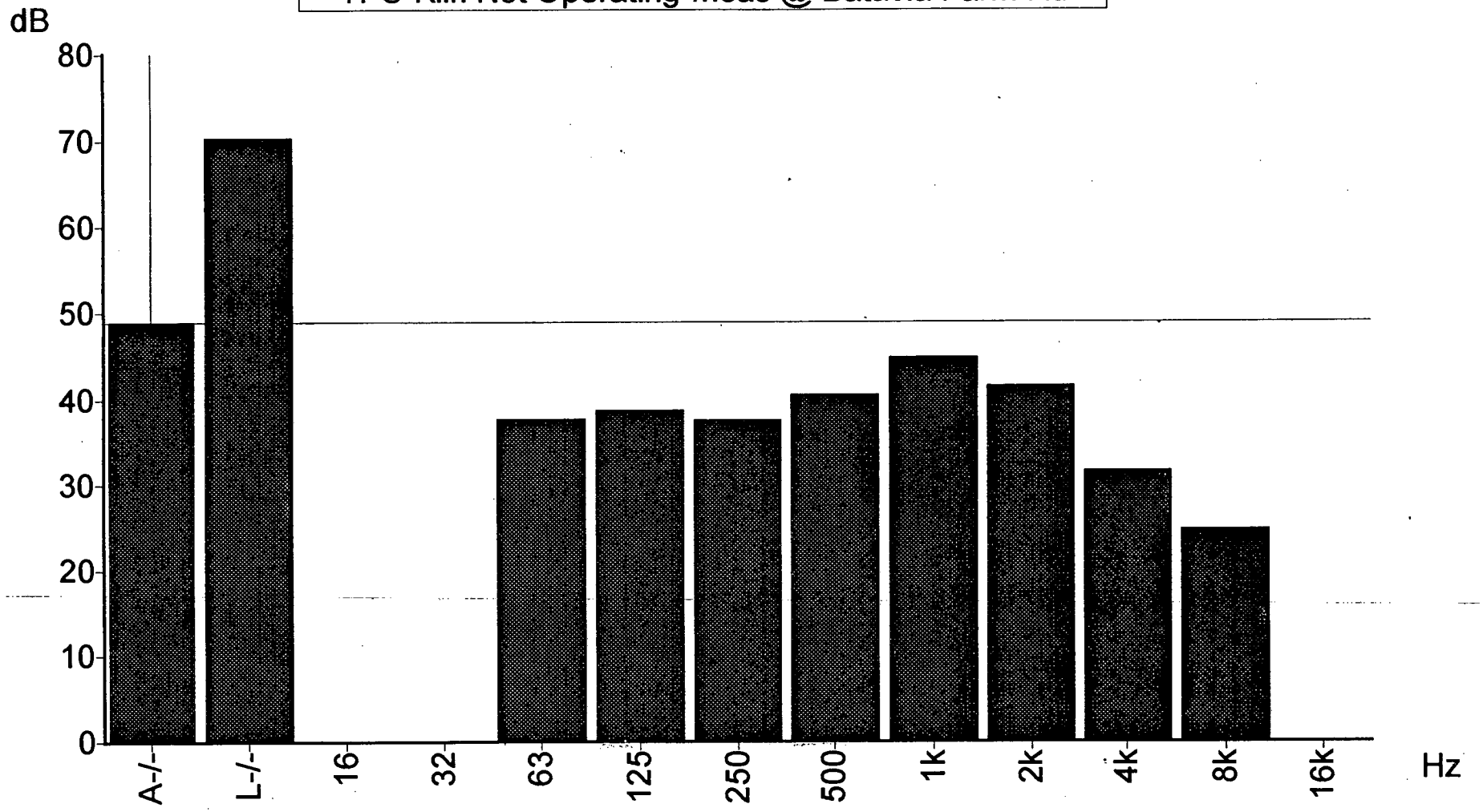
C:\DB2\F0000005.DTA
Function = Leq
Record start = 02/27/2001 13:39:43
Duration = 000 00:00:37.4
Record = Cumulative
Flags: ----
Cursor: Band = 1k Hz, Frequency weighting = A, Level = 27.1 dB



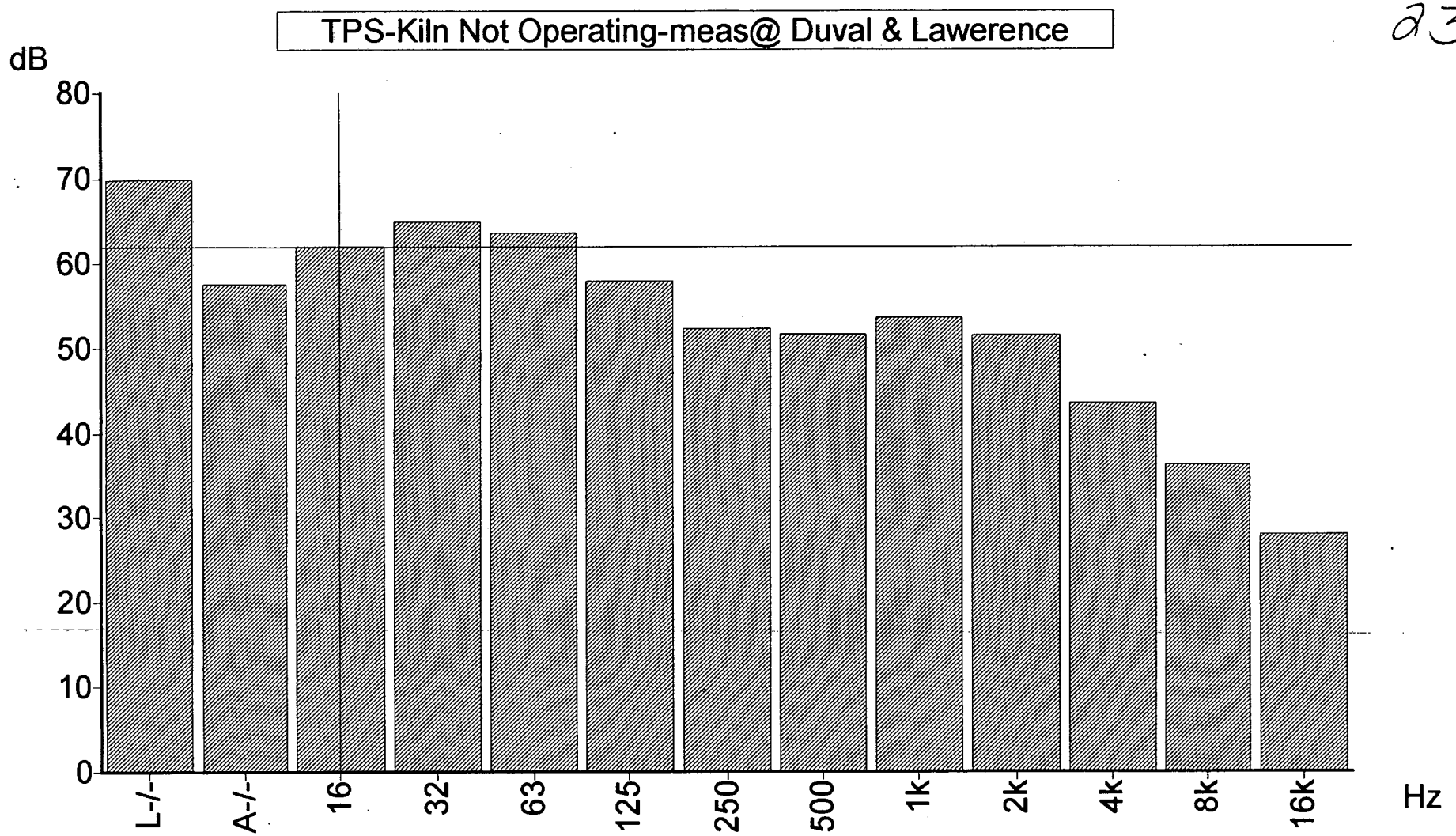
C:\DB2\F0000005.DTA
Function = Leq
Record start = 02/27/2001 11:15:05.0
Duration = 000 00:00:00.5
Record = 1 : 41
Flags: ----
Cursor: Band = 16 Hz, Frequency weighting = L, Level = 66.5 dB

22

TPS-Kiln Not Operating-meas @ Batavia Farm Rd



C:\DB2\F0000005.DTA
Function = Leq
Record start = 02/27/2001 11:16:49
Duration = 000 00:00:25.4
Record = Cumulative
Flags: ----
Cursor: Band = Broadband, Frequency weighting = A, Level = 48.9 dB



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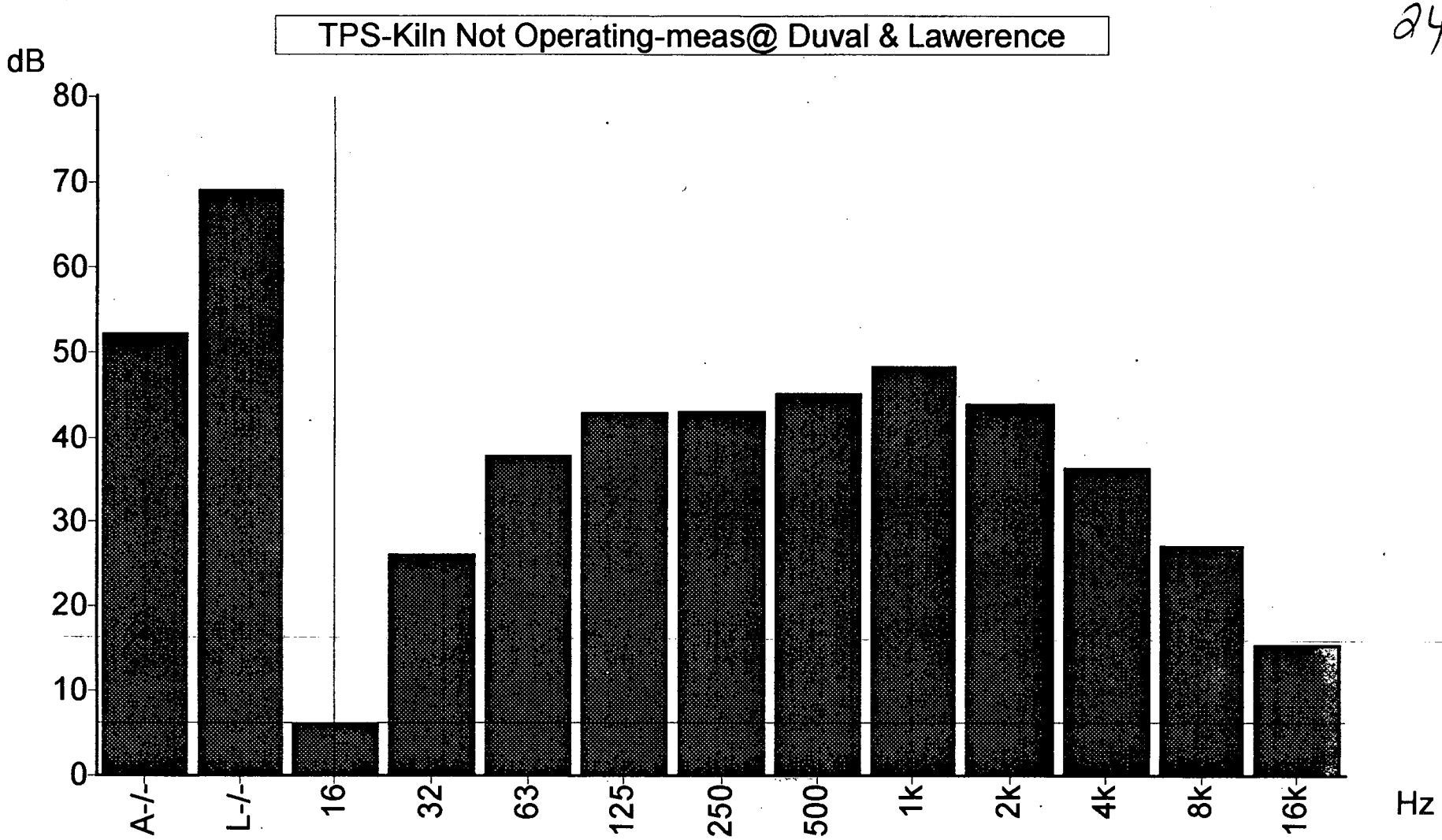
Function = Leq
Record start = 03/02/2001 07:08:04
Duration = 000 00:00:42.1
Record = Cumulative
Flags: O---
Cursor: Band = 16 Hz, Frequency weighting = L, Level = 61.9 dB



C:\DB2\F0000005.DTA
Function = Leq
Record start = 03/02/2001 07:09:19
Duration = 000 00:00:43.10
Record = Cumulative
Flags: ----
Cursor: Band = 16 Hz, Frequency weighting = A, Level = 6.2 dB

26.02.03.00

Title 26 DEPARTMENT OF THE ENVIRONMENT

Subtitle 02 OCCUPATIONAL, INDUSTRIAL, AND RESIDENTIAL HAZARDS

Chapter 03 Control of Noise Pollution

Authority: Environment Article, § 3-401, Annotated Code of Maryland

Preface

The Environmental Noise Act of 1974 of the State of Maryland declares as policy the limitation of noise to that level which will protect the health, general welfare, and property of the people of the State. It requires that the Department assume responsibility for the jurisdiction over the level of noise, and prepare regulations for the control of noise, including the establishment of standards for ambient noise levels and equipment performance with respect to noise, for adoption by the Secretary of the Environment. Enforcement of the regulations and standards is the responsibility of the Department in all areas, using the facilities and services of local agencies within the areas to the greatest extent possible. The Department shall coordinate the programs of all State agencies relating to noise abatement, and each State agency prescribing sound level limits or regulations respecting noise shall obtain the endorsement of the Department in prescribing any limits or regulations.

26.02.03.01

.01 Definitions.

A. "ANSI" means American National Standards Institute or its successor bodies.

B. "Construction" means any site preparation, assembly, erection, repair, alteration, or similar activity.

C. "Day-night average sound level (Ldn)" means in decibels, the energy average sound level for a 24-hour day with a 10 decibel penalty applied to noise occurring during the nighttime period; i.e., noise levels occurring during the period from 10 p.m. one day until 7 a.m. the next are treated as though they were 10 dBA higher than they actually are. The use of the A-weighting is understood. The mathematical expression for Ldn is as follows: See Table 26.02.03.01, Equation, p. 38.

D. "dBA" means abbreviation for the sound level in decibels determined by the A-weighting network of a sound level meter or by calculation from octave band or one-third octave band data.

E. "Daytime hours" means 7 a.m. to 10 p.m., local time.

F. "Decibel (dB)" means a unit of measure equal to ten times the logarithm to the base ten of the ratio of a particular sound pressure squared to a standard reference pressure squared. For the purpose of this subtitle, 20 micropascals shall be the standard reference pressure.

G. "Demolition" means any dismantling, destruction, or removal activities.
H. "Department" means the Department of the Environment.
I. "Emergency" means any occurrence or set of circumstances involving actual or imminent physical trauma or property damage, which demands immediate action.
J. "Environmental noise" means the noise that exists at any location from all sources.
K. "Environmental noise standards" means the A-WEIGHTED INTRUDING INTRUDING SOUND LEVEL LIMITS FOR ~~goals for environmental noise,~~ the attainment and maintenance OF AN ADEQUATE ENVIRONMENT ~~of which, in defined areas and under specific conditions, are necessary~~ to protect the public health and general welfare.
L. "Equivalent sound level" (also "average sound level") means the level of a constant sound which, in a given situation and time period, would convey the same sound energy as does the actual time-varying sound during the same period. Equivalent sound level is the level of the time weighted, mean-square, A-weighted sound pressure. A numerical subscript may be used to indicate the time period under consideration; i.e., Leq24 or Leq8 for 24-hour and 8-hour periods, respectively. No subscript indicates a 24-hour period. The mathematical expression for the Leq as follows:
See Table 26.02.03.01, Equation, p. 38.
where t1 and t2 are the beginning and ending times, respectively, of the period over which the average is determined, and LA (t) is the instantaneous A-weighted sound pressure level fluctuating with time.
M. "Nighttime hours" means 10 p.m. to 7 a.m., local time.
N. "Noise" means the intensity, frequency, duration, and character of sound, including sound and vibration of sub-audible frequencies.
O. "Noise pollution" means the presence of noise of sufficient loudness, character, and duration, which whether from a single source or multiple sources, is, or may be predicted with reasonable certainty to be, injurious to health or which unreasonably interferes with the proper enjoyment of property or with any lawful business or activity.
P. "Periodic noise" means noise possessing a repetitive on-and-off characteristic.
Q. "Person" means any individual, group of individuals, firm, partnership, voluntary association, or private, public, or municipal corporation, or political subdivision of the State, or department, bureau, agency, or instrument of federal, State, or local government, responsible for the use of property.
R. "Prominent discrete tone" means any sound which can be distinctly heard as a single pitch or a set of single pitches. For the purposes of this regulation, a prominent discrete tone shall exist if the one-third octave band sound pressure level in the band with the tone exceeds the arithmetic average of the sound pressure levels of the 2 contiguous one-third octave bands by 5 dB for center frequencies of 500 Hz and above and by 8 dB for center frequencies between 160 and 400 Hz and by 15 dB for center frequencies less than or equal to 125 Hz.
S. "Sound level" means, in decibels, the weighted sound pressure level measured by the use of a sound level meter satisfying the requirements of ANSI S1.4 1971 "Specifications for Sound Level Meters". Sound level and noise level are synonymous. The weighting employed shall always be specified.
T. "Sound level meter" means an instrument, meeting ANSI S1.4 1971 "Specifications for Sound Level Meters", comprising a microphone, an amplifier, an output meter, and

frequency-weighting network(s) that is used for the measurement of sound pressure levels in a specified manner.

U. Sound Pressure.

(1) "Sound pressure" means the minute fluctuations in atmospheric pressure which accompany the passage of a sound wave.

(2) For a steady sound, the value of the sound pressure average over a period of time.

(3) Sound pressure is usually measured in dynes per square centimeter (dyne/cm squared), or in newtons per square meter (N/m squared), or in micropascals.

V. "Sound pressure level" means, in decibels, 20 times the logarithm to the base ten of the ratio of a sound pressure to the reference sound pressure of 20 micropascals (20 micronewtons per square meter). In the absence of any modifier, the level is understood to be that of a root-mean-square pressure.

W. "Source" means any person or property, real or personal, contributing to noise pollution.

X. "Vibration" means any oscillatory motion of solid bodies.

Y. "Zoning district" means a general land use category, defined according to local subdivision, the activities and uses for which are generally uniform throughout the subdivision. For the purposes of this regulation, property which is not zoned "residential", "commercial", or "industrial", shall be classified according to use as follows:

(1) "Commercial" means property used for buying and selling goods and services;

(2) "Industrial" means property used for manufacturing and storing goods;

(3) "Residential" means property used for dwellings.

26.02.03.02

.02 Environmental Noise Standards.

A. Precepts.

(1) It is known that noise above certain levels is harmful to the health of humans. Although precise levels at which all adverse health effects occur have not definitely been ascertained, it is known that one's well-being can be affected by noise through loss of sleep, speech interference, hearing impairment, and a variety of other psychological and physiological factors. The establishment of ambient noise standards~~, or goals,~~ must provide margins of safety in reaching conclusions based on available data which relate noise exposure to health and welfare effects, with due consideration to technical and economic factors.

(2) The environmental noise standards set forth here ~~represent goals~~ expressed in terms of equivalent A-weighted sound levels ARE INTENDED TO ACHIEVE THE GOALS, which are protective of the public health and welfare. The ambient noise levels shall be achieved through application, under provisions of laws or regulations or otherwise, of means for reducing noise levels including, but not limited to, isolation of noise producing equipment, dampening of sound waves by insulation, equipment modification and redesign, and land use management.

B. Standards for Environmental Noise-----General.

(1) The ~~standards are~~ goals for the attainment of an adequate environment ARE INTENDED TO BE ACHIEVED THROUGH THE. ~~The~~ standards set out in Regulation .03 ~~are intended to achieve these goals~~.

~~(2) The following sound levels represent the standards for the State by general zoning district:~~

~~Table 1~~
~~Environmental Noise Standards~~

~~*Zoning District*~~	~~*Level*~~	~~*Measure*~~
~~Industrial~~	~~70 dBA~~	~~L (24) eq~~
~~Commercial~~	~~64 dBA~~	~~L dn~~
~~Residential~~	~~55 dBA~~	~~L dn~~

26.02.03.03

.03 General Regulations.

A. Noise and Vibration Prohibitions.

(1) A person may not cause or permit noise levels which exceed those specified in Table 2 AND 3 except as provided in § ~~A~~ B(4 ~~2~~) or (5 ~~3~~), or § ~~B~~ C, below.

B. Standards for Environmental Noise-----General.

~~(3) The standards are goals for the attainment of an adequate environment.~~

(1) The ~~following~~ sound levels IN TABLE 1 represent the standards for the State by general zoning district:

Table 1a
NOISE PRODUCING EQUIPMENT ~~Environmental Noise~~ Standards

Zoning District	*Level*	*Measure*
Industrial	70 dBA	L (24) eq
Commercial	64 dBA	L dn
Residential	55 dBA	L dn

(2) TABLE 1a SHALL BE APPLICABLE TO ALL NEW EQUIPMENT AND ANY SUBSTANTIAL REPLACEMENTS INSTALLED AFTER JANUARY 1, 2002. TABLE 2b STANDARDS SHALL BE APPLICABLE FOR THE REMAINING LIFE OF EXISTING EQUIPMENT FOR UP TO 10 YEARS. EFFECTIVE JANUARY 1, 2012 SOUND MITIGATION MEASURES SHALL BE INSTITUTED TO ABATE NOISE LEVELS TO THOSE ALLOWED IN TABLE 1a UNLESS A VARIANCE IS APPROVED.

Table 1b
NOISE PRODUCING EQUIPMENT ~~Environmental Noise~~ Standards

Zoning District	*Level*	*Measure*
Industrial	70 dBA	L (24) eq
Commercial	70 dBA	L dn
Residential	61.4 dBA	L dn

(3 ~~2~~) THE SOUND LEVELS IN TABLE 2 REPRESENT THE STANDARDS FOR THE STATE BY RECEIVING LAND USE:

Table 2 Maximum Allowable Noise Levels (dBA)
for Receiving Land Use Categories

Effective Date	Day/Night	Industrial	Commercial	Residential
	Day	75	67	65
Upon Adoption	Night	75	62	55

(4 ~~2~~) A person may not cause or permit noise levels emanating from construction or demolition site activities which exceed:

(a) 90 dBA during daytime hours;

(b) The levels specified in Table 2 during nighttime hours.

(5 ~~3~~) A person may not cause or permit the emission of prominent discrete tones and periodic noises which exceed a level which is 5 dBA lower than the applicable level listed in Table 2.

(6 4) A person may not cause or permit, beyond the property line of a source, vibration of sufficient intensity to cause another person to be aware of the vibration by such direct means as sensation of touch or visual observation of moving objects. The observer shall be located at or within the property line of the receiving property when vibration determinations are made.

C ~~B~~. Exemptions.

(1) The provisions of this regulation may not apply to devices used solely for the purpose of warning, protecting, or alerting the public, or some segment thereof, of the existence of an emergency situation.

(2) The provisions of this regulation do not apply to the following:

(a) Household tools and portable appliances in normal usage.

(b) Lawn care and snow removal equipment (daytime only) when used and maintained in accordance with the manufacturer's specifications.

(c) Agricultural field machinery when used and maintained in accordance with manufacturer's specifications.

(d) Blasting operations for demolition, construction, and mining or quarrying (daytime only).

(e) Motor vehicles on public roads.

(f) Aircraft and related airport operations at airports licensed by the State Aviation Administration.
(g) Boats on State waters or motor vehicles on State lands under the jurisdiction of the Department of Natural Resources.
(h) Emergency operations.
(i) Pile driving equipment during the daytime hours of 8 a.m. to 5 p.m.
(j) Sound not electronically amplified created by sporting, amusement, and entertainment events and other public gatherings operating according to terms and conditions of the appropriate local jurisdictional body. This includes but is not limited to athletic contests, amusement parks, carnivals, fairgrounds, sanctioned auto racing facilities, parades, and public celebrations. This exemption only applies between the hours of 7 a.m. and 12 midnight.
(k) Rapid rail transit vehicles and railroads.
(l) Construction and repair work on public property.
(m) Air conditioning or heat pump equipment used to cool or heat housing on residential property. For this equipment, a person may not cause or permit noise levels which exceed 70 dBA for air conditioning equipment at receiving residential property and 75 dBA for heat pump equipment at receiving residential property.

D ~~C~~. Variance Procedure.

(1) Any person who believes that meeting the requirements of § A, above, is not practical in a particular case may request an exception to its requirements.
(2) Requests submitted to the Department shall be in writing and shall include evidence to show that compliance is not practical.
(3) Upon receipt of a request for an exception, the Department shall schedule a hearing to be held within 60 days.
(4) The applicant for the exception, at least 30 days before the hearing date, shall advertise prominently the hearing by placing a notice in a newspaper of general circulation in the subdivision in which the facility or source for which the exception is sought is located. The notice shall include the name of the facility or source and such additional information as the Department may require.
(5) Based upon evidence presented at the hearing, the Secretary may grant an exception to § A, above, for a period not to exceed 5 years under terms and conditions appropriate to reduce the impact of the exception.
(6) Exceptions shall be renewable upon receipt by the Department of evidence that conditions under which the exception was originally granted have not changed significantly.
(7) ALL COSTS ASSOCIATED WITH THE VARIANCE PROCEDURE, TO INCLUDE COURT RECORDING, HEARING FACILITY RENTAL, DUPLICATE, MAILING, AND STAFF TIME FOR THE ACTUAL PUBLIC HEARING SHALL BE REIMBURSED TO THE STATE UPON REQUEST BY THE APPLICANT.

D. Measurement.

(1) The equipment and techniques employed in the measurement of noise levels may be those recommended by the Department, which may, but need not, refer to currently

accepted standards or recognized organizations, including, but not limited to, the American National Standards Institute (ANSI), American Society for Testing and Materials (ASTM), Society of Automotive Engineers (SAE), and the United States Environmental Protection Agency (EPA).
(2) The measurement of noise levels shall be conducted at points on or within the property line of the receiving property or the boundary of a zoning district, and may be conducted at any point for the determination of identity in multiple source situations.
(3) Sound level meters used to determine compliance with Regulation .03 shall meet or exceed the specifications of the American National Standards Institute or its successor bodies ANSI S1.4-1971 for Type II sound level meters.

26.02.03.05

.05 Penalties.

A. Civil Penalty. Any person who willfully violates these regulations shall be liable to a civil penalty of not more than $10,000. Each day during which a violation continues there shall be liability for a separate penalty.
B. Plan for Compliance. A violator who has submitted a plan for compliance with these regulations and has that plan or amendments to it approved by the Secretary, upon recommendation of the Department, may not be considered to be in violation of these regulations as long as he acts in accordance with the original or amended plan.

26.02.03.9999

Administrative History

Effective date; August 6, 1975 (2:17 Md. R. 1189) Regulation .01A-1, W-1 adopted effective February 15, 1982 (9:3 Md. R. 222); repealed effective March 28, 1983 (10:6 Md. R. 558) Regulations .01 and .03A, B, D amended effective September 14, 1977 (4:19 Md. R. 1468) Regulation .01C amended effective March 28, 1983 (10:6 Md. R. 558) Regulations .01C, Q; .02B; .03B, D amended effective February 15, 1982 (9:3 Md. R. 222) Regulation .03A amended as an emergency provision effective November 13, 1979 (6:24 Md. R. 1917); emergency status expired March 29, 1980 Regulation .03A and B amended effective March 28, 1983 (10:6 Md. R. 558) Regulation .04 repealed effective September 14, 1977 (4:19 Md. R. 1468) ---------- Chapter recodified from COMAR 10.20.01 to COMAR 26.02.03

MEETING AGENDA

ENVIRONEMTNAL NOISE ADVISORY COUNCIL AND THE INTERAGENCY NOISE CONTROL COMMITTEE

April 2, 2001
9:30 AM to 12:00 PM
Chesapeake Room/ Secretary's Conference Room (second floor)

9:30	Review Agenda	
9:35	Announce public input process (five minutes for any public observer - starting at 11:30 AM)	
9:40	Review of the minutes from March 5th meeting	
9:45	Legislative Update	George Harman
10:00	Continuous Noise options (Issue Number 1).....	George Harman
10:15	Vibrations (Issue Number 2)	Dave Jarinko
10:45	Break	
10:55	Discussion of Issue 2	
11:25	Schedule of future issues	
11:30	Public input (if speakers are present)	
12:00	Adjourn	

Tentative Long Term
Environmental Noise Council Agenda

April 2, 2001

Finalize continuous noise recommendations
Present and discuss vibration concerns and recommendations

May 7, 2001

Gun clubs - Impulse noise

June 4, 2001

NASCAR – Drag Raceways
Sporting Event exceptions

July 2, 2001

Other Issues

- agricultural equipment
- household tools – including leaf blowers
- household pets
- air conditioners/heat pumps
- rock concerts - onsite noise regulation MDE or DHMH
- variance procedure - expenses to be borne by applicant
- application of regulations by complainant or by zoning classification

Presentation of Comprehensive list of Recommendations

August

Vacations

September 10, 2001

Deliberations on Recommendations

Environmental Noise Advisory Council
And
Interagency Noise Advisory Committee
Meeting Minutes
February 5, 2001, 9:30 a.m.
Chesapeake Conference Room, MDE

Members:
Council:

Senator John Astle	ex officio	absent	
Delegate Jake Mohorovic	ex officio	absent	
Dr. Stephen Epstein	MedChi	absent	
Dr. Ilene Busch-Vishniac	Acoustical Society	absent	
Dr. Fred Schmitz	U of MD	present	
Michael Powell	Public (business)	absent	Ben Alliker representing
Nancy Benner	Public	present	

Committee:

Robin Grove, Chair	MDE	present
Jesse Heier	Governor's Office	absent
Bill Grabau	MOSH	present
Ken Polcak	MDOT	present
Fred Sherbert	DNR	present
Vacant	DHMH	absent

Others:
Julia Yaffe — Beth Tifiloh High School
Marion Benner

MDE Staff:
Robert Field
George Harman
Bill Parrish
Robin Grove
Dave Jarinko

The second official meeting of the Noise Advisory Council and Interagency Noise Committee was convened at 9:30 AM on March 5th at the Department of the Environment.

Introductions
Handouts from the previous meeting will be provided.

- Minutes of the February meeting were considered with a request for opinions regarding the scope and detail for future minutes.
- Legislative update:
  - SB 376 would require additional two inspectors within the Department

No position taken by the Department. Public comments rendered by three members of the Rosedale and Chesaco communities from Eastern Baltimore County.

- SB 869 would prevent fifteen counties from regulating gun clubs and the State from regulating these clubs in fourteen counties.

- Presentation by MDOT - Ken Polcak
  1. Three periods – pre 1987 no policy for noise and sound barriers
  2. 1987 to 1998 – general policy
  3. 1993 – began detailed analysis, review of FHWA policy
  4. FHWA mandated that every state have a policy
  5. Implemented in May 1998
     - Review – date of construction, reasonableness, will spend up to $50,000/residence benefited
     - Noise levels must be above 66 dB
     - Barrier must be anticipated to reduce noise levels by 7-10 dB at the most severely
     - Construction only in counties with local controls – building codes for potentially impacted buildings
  6. Type I Program – changes in highway (widening, new interchange, etc.) causes changes in noise
  7. Type II Program – housing had to exist prior to the highway, house not current occupant Counties must have a noise ordinance in place (building codes) before any consideration is given to constructing noise barriers under this program. This is designed to prevent any future development from requiring noise barriers.

Discussion:
Trees next to barriers may reflect noise (especially the higher frequency components) over the barriers. This may be correct, but field measurements do not indicate that significant levels are transmitted in this manner.

Coming to the Nuisance – Under common law, individuals that come to a nuisance are not able to sue. Maryland is one of the states that allows individuals to sue so long as the character of the noise does not change, regardless of when they move to the location.

Shortcoming of local noise ordinances that establish building codes for highway noise is that they do not address outdoor living concerns.

Vines are encouraged to help abate noise.

In Europe, the barriers are tilted outward to promote upward reflections of noise. FHWA studies indicate that a ratio of less than 10:1 (distance to height) can be a problem.

Process Issue:
Council has a 60-day requirement to provide recommendations to the Department once they are suggested by the Department. MDE would prefer to have all of the issues discussed

individually, and then package the issues for formal presentation to the Council for advice. This process is being suggested because some of the issues have the potential for overlap and it is believed that the package of recommendations should be reviewed as a whole. This process will also provide for more clarity in the timelines required in the statute for responding.

List of potential issues to be discussed:

1 continuous noises (March meeting)
2 vibration (ground vs. air) (low frequency sound as a source)
3 agricultural equipment
4 gun clubs - sporting events
5 application of regulations by complaint or by zoning classification
6 clarification of impulse definition
7 household tools – including leaf blowers
8 household pets
9 air conditioners
10 rock concerts - onsite noise regulation MDE or DHMH
11 drag racing/NASCAR – sporting events
12 variance procedure - expenses to be borne by applicant
13 other issues of interest

- Continuous Noise – Issue Exploration – presentation and discussion lead by George Harman

Issue Number 1 – Continuous Noise

Background:

We currently enforce maximum noise levels.
Generally: 65 dBA day and 55 dBA night
In urban and suburban areas – daytime background is often up to 55 dBA.
Thus, the background levels mask perception of continuous noises in this range.
Nighttime background levels are usually much lower (e.g. 30 – 40 dBA in suburban situations.
Thus, 55 dBA can be annoying at night in these locations.
A secondary goal was established 25 years ago – Table I in the regulations = 55 dBA L_{dn}.

Refresher definitions:
dBA = decibels, A-weighted, to mimic human perception
linear measurement = not A-weighted, absolute values
$L_{eq}(24)$ = 24-hour average, dBA Leq (24) = 24-hour average A-weighted noise level
L_{dn} = calculated (see attached example) 24-hour day/night average with a 10 dBA penalty for nighttime hours
L_n = average for nigttime hours
L_d = average for daytime hours

Question for the Council – Should the goal stated in Regulation 02.B, Table I – 55 L_{dn} be established as a standard?

Should the language in Regulation 02.B, which links the words "standards and goals", be revised to be less ambiguous?

If the Council finds that Table I levels should be firmly established as standards, we will propose the package found in Tab 1 of the loose leaf binder as a recommendation. In addition to the change in the text, we would also move the Table from 02 (Goals) to 03 (Standards).

Implications:
This could apply to a large number of facilities.
This could affect HVAC or similar ventilating units, such as at Walter Reed Hospital.
This could affect HVA units in strip shopping centers that back up to residential properties.
This would affect power companies that are planning rural power plants (ODEC in Cecil, Kelson Ridge in Charles, eastern shore chicken waste processing plants, and other commercial facilities such as TPS Technologies in Rosedale).

The actual 55 dBA L_{dn} appears to be similar to the Table II maximum levels, however:

Calculations for the L_{dn} require that10 dBA be added to nighttime levels in the calculation. Thus, nighttime levels of 55 are converted to 65 for purposes of calculating a L_{dn}. Therefore, a continuous 55 dBA source will exceed a 55 L_{dn} if the facility operates 24 hours per day.

Some examples of the calculation are:

SITUATION REGARDING CONTINUOUS NOISES

24- hour Continuous	L_{dn}	CNEL
55	61.4	61.7
53	59.4	
52	58.4	58.7
50	56.4	
48.6	**55.0**	**55.3**

A 24-hour operation would, therefore, need to operate a 48.6 dBA to achieve a 55 dBA L_{dn}. Or, the facility would need to cease operations for a portion or all of the nighttime hours.

The potential of employing a CNEL process for calculating a 24-hour average condition was proposed. In essence, this would be a variation on L_{dn}. In this calculation, 5 dBA is added to the values measured during the 7 to 10 PM time period. Sample calculations are shown in the above table.

Vibration Issue – introduced
Typical complaints with vibration relate to ground transmission.
Airborne transmission of low frequency components of the sound spectrum can also induce vibrations.
Should the State consider establishing numerical standards for the low frequency noise that can penetrate buildings and cause vibrations?

12:00 Adjourned

The **next meeting** of the Noise Advisory Council and Interagency Noise Committee will be on Monday, **April 2, 2001 – 9:30 to noon**. The location will be in the Chesapeake Room (second floor).

Inquiries should be directed to:
Robin Grove
George Harman
Bill Parrish
Dave Jarinko
through
Carolyn Kuciara at 410-631-3183

Day-Night Average Sound Level

The day-night average sound level (DNL; symbol, Ldn) is a 24 hour average A-weighted sound level where a 10 dB "penalty" is applied to sound occurring between the hours of 10:00 p.m. and 7:00 a. m. The 10-dB penalty accounts for the heightened sensitivity of a community to noise occurring at night. Among agencies using the day-night average sound level in their criteria and regulations are the EPA, FAA, and HUD.

Examples; Constant Level Machinery Noise

Day 7a.m.-10 p.m. Night 10p.m.- 7 a.m.

1. 55 dBA (15 hrs) | 45 dBA (9 hrs.) + 10 dBA = 55 Ldn

2. 48.6 constant (15 hrs) | 58.6 dBA (9 hrs.) + 10 dBA = 55 Ldn

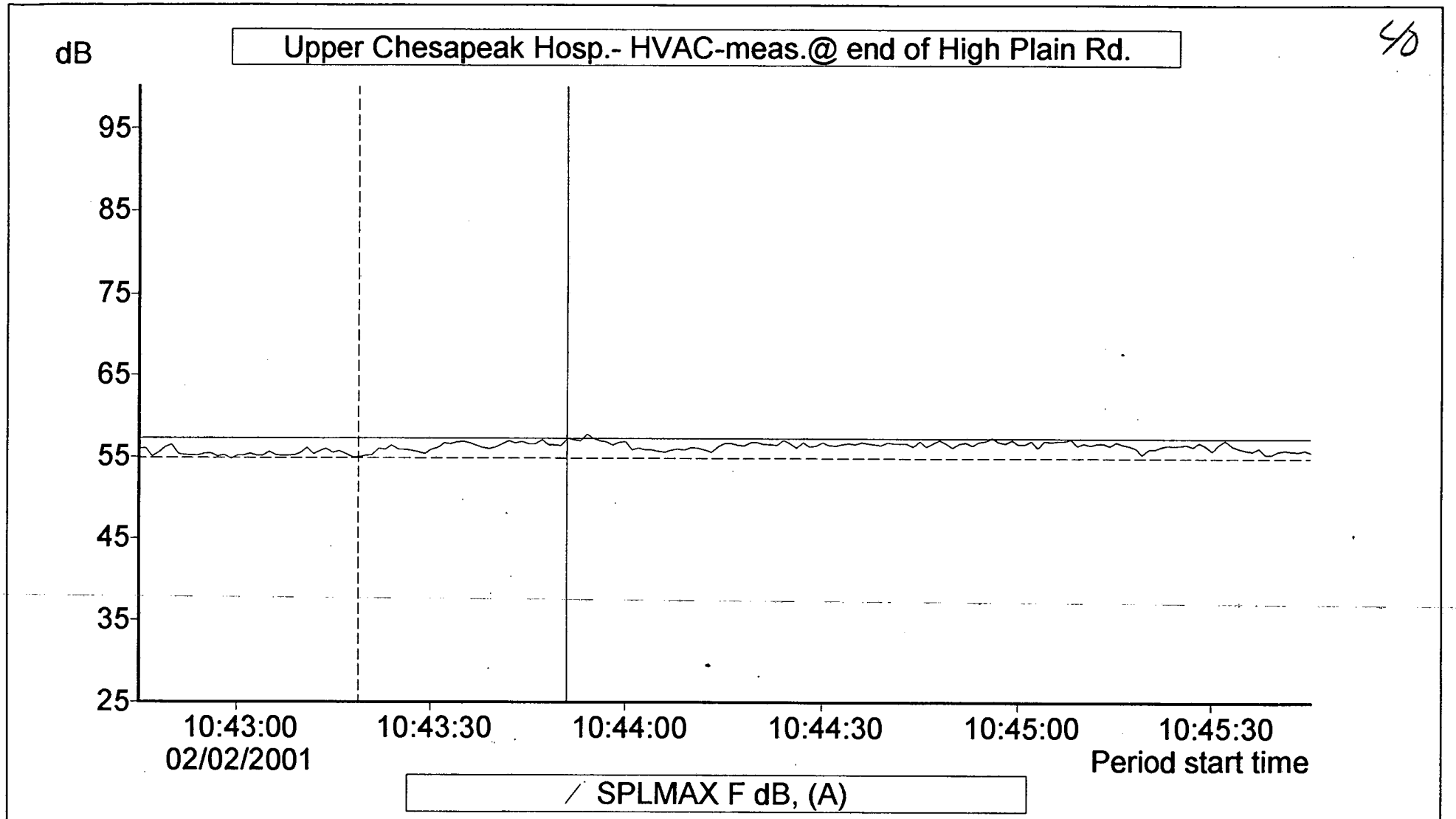
3. 55 dBA constant (15 hrs) | 65 dBA (9 hrs.) + 10 dBA = 61.4 Ldn

4. 65 dBA Constant (15 hrs) | No operation (9 hrs.) = 62.9 Ldn

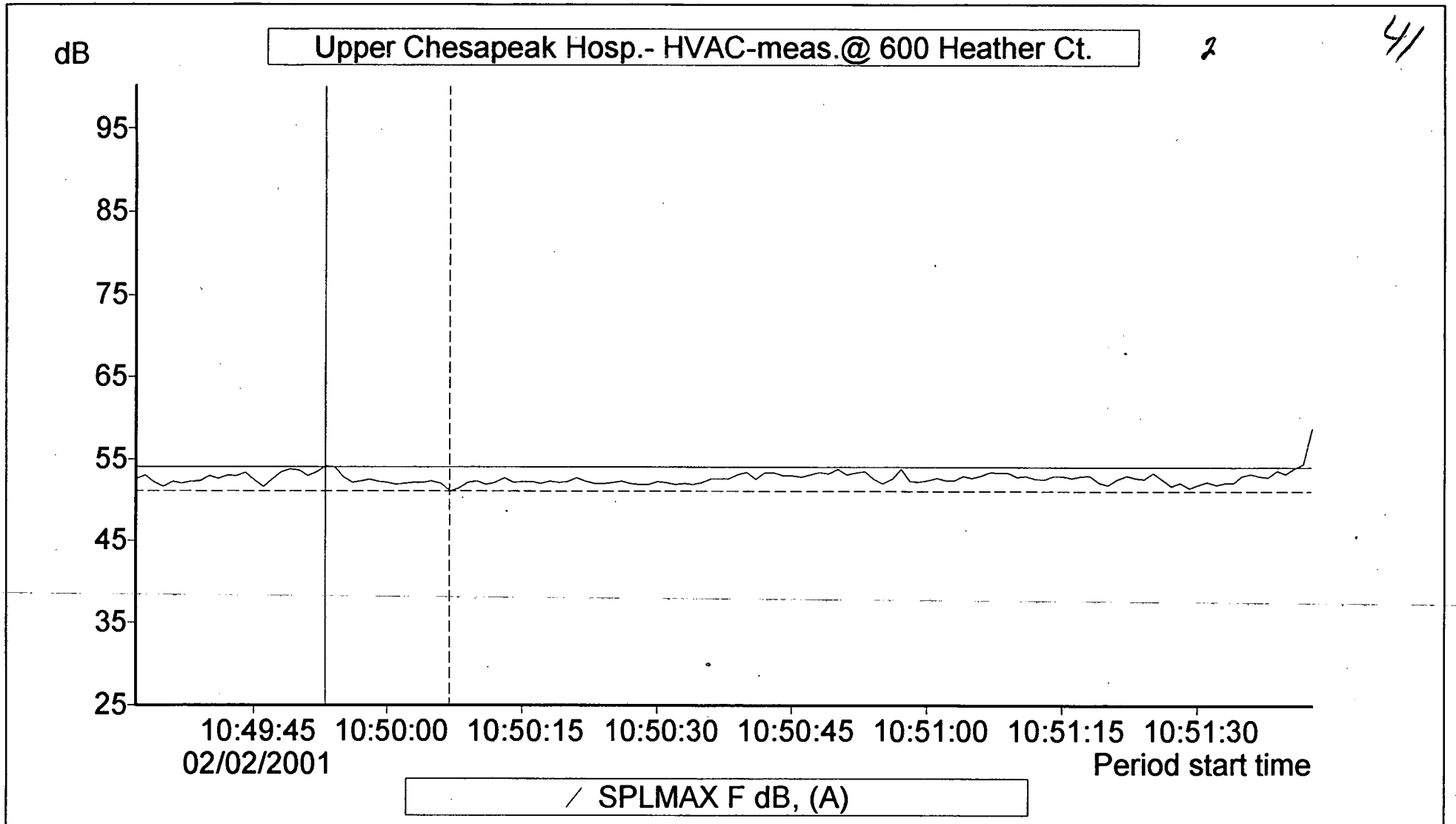
DAY–NIGHT EQUIVALENT SOUND LEVEL

In the United States during the 1970s, the Environmental Protection Agency developed a measure, from the equivalent sound level, known as the *day–night equivalent level* (DNL) or L_{dn} that accounts for the different response of people to noise during the night.[27]

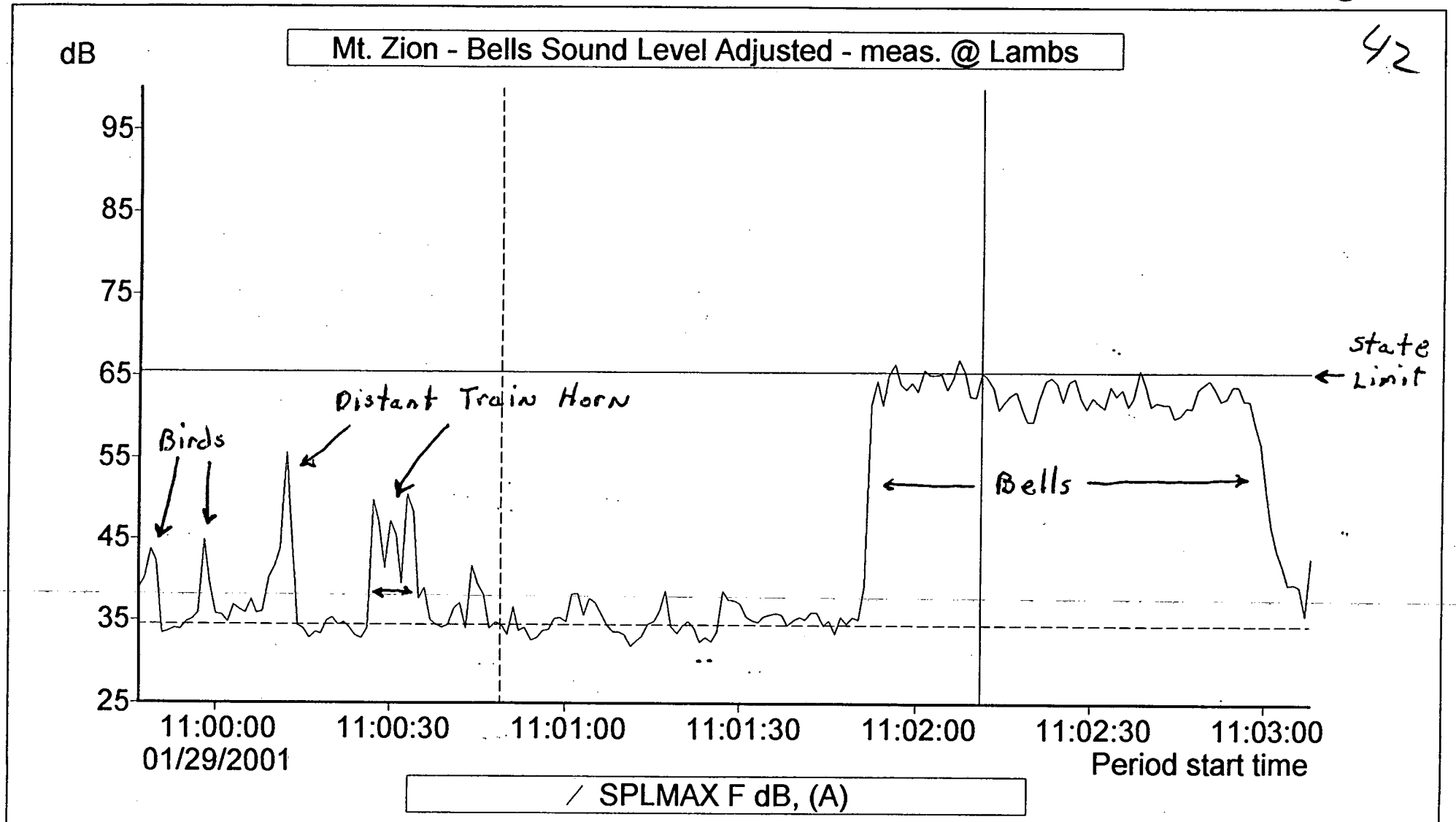
$$L_{dn} = 10 \log \frac{15(10^{L_d/10}) + 9(10^{(L_n+10)/10})}{24},$$



C:\DB2\F0000005.DTA
Band = Broadband
Overall profile duration = 000 00:03:01 (181 samples)
Function order = SPLMAX F dB, (A)
Cursor 1: Time = 02/02/2001 10:43:51, Level = 57.3 dB, Flags: ----
Cursor 2: Time = 02/02/2001 10:43:19, Level = 54.9 dB, Flags: ----
Duration on / between the cursors = 000 00:00:33, Flags: ----, Scale: 1:1



C:\DB2\F0000005.DTA
Band = Broadband
Overall profile duration = 000 00:02:12 (132 samples)
Function order = SPLMAX F dB, (A)
Cursor 1: Time = 02/02/2001 10:49:53, Level = 54.1 dB, Flags: ----
Cursor 2: Time = 02/02/2001 10:50:07, Level = 51.1 dB, Flags: ----
Duration on / between the cursors = 000 00:00:15, Flags: ----, Scale: 1:1



C:\DB2\F0000005.DTA
Band = Broadband
Overall profile duration = 000 00:03:22 (202 samples)
Function order = SPLMAX F dB, (A)
Cursor 1: Time = 01/29/2001 11:02:11, Level = 65.5 dB, Flags: ----
Cursor 2: Time = 01/29/2001 11:00:49, Level = 34.5 dB, Flags: ----
Duration on / between the cursors = 000 00:01:23, Flags: ----, Scale: 1:1

Dist. @ 300 feet.

MEETING AGENDA

ENVIRONMENTNAL NOISE ADVISORY COUNCIL
AND THE INTERAGENCY NOISE CONTROL COMMITTEE

March 5, 2001
9:30 AM to 12:00 PM
Susquehanna Room (first floor next to lobby)

9:30 Review Agenda

9:35 Announce public input process
(five minutes for any public observer - starting at 11:30 AM)

9:40 Review of the minutes from Feb. 5th meeting

9:45 Brief announcements or comments by any members

9:50 Presentation by MDOT..... Ken Polcak

10:15 Issue Number 1 --- Continuous Noise – Applicability of Table I ..... George Harman

10:45 Break

10:55 Discussion of Issue 1

11:20 Issue 2 – Vibrations (introduction if time allows) ..... George Harman

11:30 Discussion of Issue 2 or Public input (if speakers are present)

12:00 Adjourn

Environmental Noise Advisory Council
And
Interagency Noise Advisory Committee
Meeting Minutes
February 5, 2001, 9:30 a.m.
Chesapeake Conference Room, MDE

Attendees: Senator John Astle, Tim Perry (Senator Mike Miller's staff), Bill Grabau, Nancy Benner, Dave Jarinko, Ken Polcak, Robert Field, Dr. Stephen Epstein, Major Maurice Davis, George Harman, Bill Parrish, and Robin Grove

Not in attendance: Delegate Jake Mohorovic, Michael Powell

This was the first official meeting of the Noise Advisory Council and Interagency Noise Committee.

Minutes of the December meeting were opened for review. There were no changes offered.

The process for allowing public input was discussed. A consensus was reached that would provide each interested member of the public five minutes during the last 30 minutes of the meeting to present their concerns.

The Council is required by statute to have a Chair, Vice Chair and Secretary. Volunteers for these posts, which are to be appointed by the Secretary, were requested to advise Mr. Grove of their interest.

If issues arise that require voting, the two groups agreed to basic meeting procedures of having motions and seconds required, discussions, and a vote. Members of each group would be allowed to vote only on those issues relating to the statutory mandate. The goal of the group would be to strive for an overall consensus. Alternates would not have voting privileges. A quorum for voting would also be required.

Dr. Epstein made a presentation "Medical Aspects of Noise Pollution".

Major Maurice Davis (alternate for Col. Fred Sherbert) of DNR made a presentation "Natural Resources Police and Noise". (NR §8-725.4, Title 8 Subtitle 08 Chapter 03 Noise Level Limits of Vessels)

Bill Grabau (MOSH) made a presentation OSHA's Occupational Noise Exposure regulations that are contained in 29 CFR 1910.95.

David Roberts (DHMH) made a presentation on the role of the Department of Health and Mental Hygiene's outdoor concert requirements regarding sanitation issues. Noise is not included in those regulations.

The structure of future meetings was then discussed. One or more agency or technical presentations will be provided for educational purposes. After which, various issues will be presented and discussed. A preliminary list of potential topics, although not mentioned at the meeting, is provided below:

1 continuous noises (March meeting)
2 vibration (ground vs. air) (low frequency sound as a source)
3 agricultural equipment
4 gun clubs - sporting events
5 application of regulations by complaint or by zoning classification
6 clarification of impulse definition
7 household tools – including leaf blowers
8 household pets
9 air conditioners
10 rock concerts - onsite noise regulation MDE or DHMH
11 drag racing/NASCAR – sporting events
12 variance procedure - expenses to be borne by applicant
13 other issues of interest

Each issue will be introduced with a technical presentation followed by discussion. Recommendations will be developed through the discussion process.

The first issue to be considered at the March meeting will be continuous noise resulting from equipment.

There is on bill introduced in Annapolis concerning noise. Senate Bill 376 would raise the number of state inspectors from one to three.

The **next meeting** of the Noise Advisory Council and Interagency Noise Committee will be on Monday, **March 5, 2001 – 9:30 to noon**. The location will be in the Susquehanna Room (first meeting) just off of the Lobby.

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MEETING AGENDA

ENVIRONMENTAL NOISE ADVISORY COUNCIL
AND THE
INTERAGENCY NOISE CONTROL COMMITTEE

February 5, 2001
9:30 AM to 12:30 PM
Susquehanna Room

9:30 Introductions; Review Agenda.....Robin Grove

9:35 Discuss Public Input Process.....Robin Grove

9:45 Review of Minutes from December 11 meeting.....Robin Grove

10:00 Presentation on Medical Aspects of Noise Pollution.....Dr. Stephen Epstein

10:15 Presentation on MOSH Noise Program.....William Grabau

10:45 Break

11:00 Presentation on Natural Resources Police Marine Noise Control Program.....
Major Maurice Davis

11:15 Presentation on DHMH Noise Program.....Dave Roberts

11:30 Discussion of Proposed Amendments to Regulation .02B Standards for
Environmental Noise - General.....George Harman

12:00 Public Comment and Discussion.....Open

The Engineering Society For Advancing Mobility Land Sea Air and Space®
INTERNATIONAL
400 Commonwealth Drive, Warrendale, PA 15096-0001

SURFACE VEHICLE RECOMMENDED PRACTICE

Submitted for recognition as an American National Standard

SAE J2005

Issued 1991-12

STATIONARY SOUND LEVEL MEASUREMENT PROCEDURE FOR PLEASURE MOTORBOATS

1. Scope—This SAE Recommended Practice establishes the procedure for determining if pleasure motorboats have effective exhaust muffling means when operating in the stationary mode. It is intended as a guide toward standard practice and is subject to change to keep pace with experience and technical advances.

1.1 Purpose—This document specifies guidelines for stationary sound level measurements for boats with above-water exhaust systems.

2. References

2.1 Applicable Documents—The following publications form a part of this specification to the extent specified herein.

2.1.1 ANSI PUBLICATIONS—Available from the American National Standards Institute, Inc., 11 West 42nd Street, New York, NY 10036-8002.

ANSI S1.4-1983 and S1.4A-1985—Specifications for Sound Level Meters

2.2 Related Publications—The following publications are provided for information purposes only and are not a required part of this document.

2.2.1 SAE PUBLICATIONS—Available from SAE, 400 Commonwealth Drive, Warrendale, PA 15096-0001.

SAE J34—Exterior Sound Level Measurement Procedure for Pleasure Motorboats

2.2.2 ANSI PUBLICATIONS—Available from the American National Standards Institute, Inc., 11 West 42nd Street, New York, NY 10036-8002.

ANSI S1.1-1960(1976)—Acoustical Terminology

ANSI S1.13-1971(R1986)—Methods for the Measurement of Sound Pressure Levels

3. Instrumentation—The following instrumentation shall be used for the measurement required:

3.1 A sound level meter which meets ANSI Standard S1.4-1983 Type 1 or Type 2 Specification for Sound Level Meters.

3.2 A microphone windscreen that does not affect the overall reading by more than ±0.5 dB(A).

3.3 A sound level calibrator. (See 5.3.)

4. Procedure

4.1 Measurement Site—A suitable site is a body of water free of large obstructions or reflective surfaces such as buildings, boats other than those involved in this procedure, large embankments or breakwaters, etc., for a minimum distance of 8 m (25 ft) from the boat being measured. The boat being tested shall either be moored to a dock or lashed to another boat. If moored to a dock, the dock shall be of open construction so that it presents a minimum of reflecting surfaces. If the measurement is made in open water, the boat being evaluated shall be lashed to the measurement boat to prevent relative motion and to allow positioning of the microphone in the prescribed location. The measurement boat shall be positioned to minimize reflected sound.

4.2 Boat Operation—The engine shall be operated at low idle speed within the engine manufacturer's recommended operating range, in neutral gear if so equipped. For motorboats without a neutral gear, the engine shall be operated at its lowest operational speed. The engine shall be operated for a sufficient amount of time to allow water to flow through the exhaust system before taking measurements.

4.3 Measurements

4.3.1 The microphone shall be placed at a distance of 1.2 to 1.5 m (4 to 5 ft) above the water and no closer than 1 m (3.3 ft) from the vertical projection of any part of the boat in the area adjacent to the exhaust outlet(s).

4.3.2 The meter shall be set for slow response and the A-weighting network.

4.3.3 The observer reading the meter shall not be closer than arm's length from the microphone to minimize sound reflections.

4.3.4 The applicable reading shall be the average sound level measured during a period when the background sound level is at least 10 dB lower than the measured sound level. Background sound level includes wind effects, noise from boats other than the one being measured, wave action, boat wakes, and other extraneous noises. Peak readings of intermittent sound levels created by wave slaps or changes in sound level due to wave action and/or engine speed variation shall not be included in the applicable reading.

4.3.5 The observer shall record the applicable reading and the background sound levels taken immediately before and immediately after the applicable reading.

5. General Requirements

5.1 The measurements shall be conducted only by persons qualified by training to perform these measurements.

5.2 Proper use of all test instrumentation is essential to obtain valid measurements. Operating manuals or other literature furnished by the instrument manufacturer should be consulted for both recommended operation of the instrument, and precautions to be observed.

5.3 Proper acoustical calibration shall comprise the complete measurement system including extension cables, etc. Field calibration shall be performed immediately before and after each test sequence.

5.4 A measurement shall be invalid if changes in the background sound level affect the applicable reading.

5.5 The use of the word "shall" in the procedure is to be understood to be mandatory, while the word "should" is to be understood as advisory.

PREPARED BY THE SAE MARINE SOUND LEVEL SUBCOMMITTEE OF THE SAE MARINE TECHNICAL COMMITTEE AND THE SAE SPECIALIZED VEHICLE AND EQUIPMENT SOUND LEVEL COMMITTEE

Appendix A

This procedure has been developed as a guide for governmental agencies to enforce the requirement for effective muffling means in pleasure motorboats. The measured level is not an indication of maximum operational sound levels.

In most applications involving thru-transom exhaust the microphone location should be 1 m (3.3 ft) aft of the intersection of the vertical plane of the aft-most part of the transom and the vertical plane of the port-most or starboard-most part of the funnel at the specified height of 1.2 to 1.5 m (4 to 5 ft) above the surface of the water with the microphone oriented toward the exhaust outlet(s).

Care must be taken to avoid erroneous readings due to sound reflections by proper positioning of the enforcement boat such that minimal extension of the enforcement hull protrudes into the area surrounding the microphone during measurements. Only one enforcement boat shall be in the area where measurements are being taken.

Sound level limits should generally have tolerance band to compensate for variations in test sites, boats, and weather conditions. Background information is included in the SAE J2005 Rationale Statement.

Rationale—The primary method of enforcing boat noise regulations by the states which currently have boat noise legislation is based on the pass-by noise test procedure SAE J34, the Exterior Sound Level Measurement Procedure for Pleasure Motorboats. SAE J34 has some major drawbacks when utilized as sound level measurement technique for law enforcement purposes. The procedure requires that a sound level meter be located at a precise distance from a measured course through which a boat is traveling at maximum speed, requiring extreme skill and care on the part of the boat operator. Locating an acceptable test site to perform these high-speed tests is a problem often encountered by enforcement officers when utilizing pass-by sound level measurements.

Most complaints about boat noise originate with boats which are operated without exhaust mufflers. SAE J2005, the Stationary Sound Level Measurement Procedure for Pleasure Motorboats, was developed at the request of law enforcement officials who requested an exhaust noise sound level measurement procedure which can be performed in the safest possible manner and without the need for a special test course.

SAE J2005 can be performed at a dock or in open water with the boat tethered to an enforcement boat. To perform the measurement a boat with above-water exhaust is operated at idle speed in neutral or at its lowest operational speed. The sound level meter is positioned 1.2 to 1.5 m above the water surface and at a distance of 1 m (3.3 ft) from the side of the boat through which the exhaust exits while the average sound level is measured and recorded. Those boats which are excessively noisy during stationary mode operation are considered to have ineffective exhaust muffling. Consequently, this procedure provides law enforcement officials with a safe method of evaluating exhaust noise levels which can be readily performed anywhere on the water.

Relationship of SAE Standard to ISO Standard—Not applicable.

Application—This SAE Recommended Practice establishes the procedure for determining if pleasure motorboats have effective exhaust muffling means when operating in the stationary mode. It is intended as a guide toward standard practice and is subject to change to keep pace with experience and technical advances.

Reference Section

SAE J34—Exterior Sound Level Measurement Procedure for Pleasure Motorboats

ANSI S1.1-1960(1976)—Acoustical Terminology

ANSI S1.13-1971(R1986)—Methods for the Measurement of Sound Pressure Levels

ANSI S1.4-1983 and S1.4A-1985—Specifications for Sound Level Meters

Committee Composition

Developed by the SAE Marine Sound Level Subcommittee

R.A. Lanpheer, Brunswick Corporation, Oshkosh, WI—Chairman

R.J. Baldwin, Bruel & Kjaer Instruments, Marlborough, MA

D.D. Beach, Jr., National Marine Manufacturers Association, Chicago, IL

R. Cheng, Outboard Marine Corporation, Waukegan, IL

F. Garcia, Yamaha Motor Corporation USA, Cypress, CA

L.F. Jungbluth, Twin Disc Inc., Racine, WI

C. Schmidt, Volvo Penta of America, Northvale, NJ

J.D. Shetler, Kawasaki Motor Corporation, Irvine, CA

Sponsored by the SAE Marine Technical Committee and the SAE Specialized Vehicle and Equipment Sound Level Committee

Marine Technical Committee

R.L. Sluka, Detroit Diesel Corporation, Detroit, MI—Chairman

L. Bibow, Brunswick Corporation, Stillwater, OK—Vice Chairman

D.D. Beach, Jr., National Marine Manufacturers Association, Chicago, IL

D.R. Brower, Cummins Engine Company Inc., Columbus, IN

J.R. Draxler, Mercury Marine Corporation, Fond du Lac, WI

E. Charles Game, II, Minstar Inc., High Point, NC

F. Garcia, Yamaha Motor Corporation USA, Cypress, CA

D. Graham, Morse Controls, Hudson, OH

L.B. Gray, American Boat and Yacht Council, Millersville, MD

R.D. Hallengren, Caterpillar Inc., Mossville, IL

D.J. Kerlin, US Coast Guard, Washington, DC

R.N. Leeper, John Deere, Waterloo, IA

F.L. Miszczak, Fel-Pro Inc., Skokie, IL

D.I. Reed, Hixson, TN

W.M. Rosenfeld, Port Chester, NY

J.D. Shetler, Kawasaki Motor Corporation, Irvine, CA

J.J. Troyan, Jr., Borg Warner Automotive Inc., New Bedford, MA

Specialized Vehicle and Equipment Sound Level Committee

J.B. Walsh, American Suzuki Motor Corporation, Brea, CA—Chairman

T.M. Disch, Briggs & Stratton Corporation, Milwaukee, WI

D. Germain, Bombardier Inc., Valcourt, Quebec, Canada

L.F. Jungbluth, Twin Disc Inc., Racine, WI

R.A. Lanpheer, Brunswick Corporation, Oshkosh, WI

Title 10
DEPARTMENT OF HEALTH AND MENTAL HYGIENE

Subtitle 16 HOUSING

Chapter 05 Outdoor Musical Festivals

Authority: Article 56 §159A, Annotated Code of Maryland

.01 Definitions.

A. "Outdoor musical festival" means a group or group of persons participating in musical entertainment in open spaces and not in a permanent structure and not on publicly owned property.

B. "Promoter" means the:

(1) Organizer, operator, producer, or the person or persons, or corporation staging the outdoor musical festival; and

(2) Owner, tenant, or lessee of the land upon which the outdoor musical festival is performed.

C. "Spectator" means a member of a gathering of 1,000 or more persons who are in attendance for the purpose of viewing or hearing the outdoor musical festival. In Washington and Frederick Counties, "spectator" means a member of a gathering of 500 or more persons who are in attendance for the purpose of viewing and hearing the outdoor musical festival.

.02 Licensing Procedures.

A. Promoters applying for a permit to conduct an outdoor music festival shall complete a Maryland Department of Health and Mental Hygiene Form entitled "Application for Permit to Conduct an Outdoor Music Festival" and submit this form in triplicate to the deputy State health officer for the county in which the festival is to be held at least 30 days before the date that the festival is scheduled to begin.

B. The applicant shall complete all information requested on the application and the information shall be the basis for which the permit is issued. Inconclusive information or a misrepresentation of information shall be grounds for denial or revocation of the permit.

C. Attached to the application shall be a site plan outlining the following locations:

(1) All campsites;

(2) All sanitation facilities;

(3) Water supply;

(4) Refuse and garbage disposal facilities;

(5) Sewage disposal facilities including public sewer systems, private sewage systems, and dump stations;

(6) Entertainment stage;

(7) All food facilities for service to the public.

.03 Sanitation, Medical, and Health Facilities.

Promoters shall establish adequate sanitation, medical, and health facilities.

A. Lavatory Requirement. Toilets or portable sani-toilets shall be provided in the ratio of 1 per 100 persons of the maximum number of spectators anticipated at the music festival with the stipulation that the maximum number anticipated be strictly adhered to or that the contract with the portable toilet supplier have a clause in which the supplier indicates that he is capable of and will provide the proper ratio of portable toilets if the maximum number of anticipated spectators is exceeded.

B. Dump Stations. Overnight spectators shall be provided with a dump station or a scavenger service shall be provided by the promoter to remove sewage from the holding tanks of recreational vehicles on a daily basis.

C. Water Supply. Potable water shall be provided by the promoter from a source or supply approved by the county health department. Water shall be tested bacteriologically by the county health department at least 2 months or less before the musical event in order to verify or determine its potability. In determining the total quantity of water required, a figure of 5 gallons per person per day shall be used in computation. If the water supply on the site is inadequate in volume or quality, a temporary potable supply may be trucked in for dispensing to the spectators in order to satisfy the requirement of providing a potable water supply.

D. Disposal of Garbage. Adequate sanitation for garbage and refuse removal shall be provided by the promoter on a daily or more

frequent basis so as not to create a health problem, hazard, or nuisance both during and after the musical event.

E. Litter. Litter control shall be provided by the promoter throughout the length of the musical event so as to prevent the accumulation of bottles, broken glass, or other sharp and dangerous objects on the premises.

F. Insect Control. Insect control shall be provided by the promoter where or when necessary in the form of a mosquito spray program, a tick control program, or other program as determined by whatever insects are evident upon inspection by the county health department. All insecticides or larvicides shall meet the prior approval of the county health department.

G. Emergency Health Services. Emergency health services shall be provided in the form of a physician on call at all times, a first-aid kit, an emergency vehicle transport service to transport any injured or ill spectators, and an area set aside to treat spectators with minor injuries or illnesses. The adequacy of the emergency health care services shall be determined by the deputy State health officer.

H. Permit. The "Permit for a Music Festival" shall stipulate the maximum number of spectators to be accommodated and the duration of the event.

.04 Withholding of Permit.

The requirements of Regulation .03D shall be met by the promoter, or issuance of the permit may be withheld. The absence or inadequacy of any one of the above items shall be sufficient grounds for denial or revocation of the permit.

.05 Cash Bond.

All promoters are required by the deputy State health officer for the county to post a cash bond of not more than $50,000, but not more than $25,000 in Washington and Frederick Counties.

.06 Issuance of Permit.

Upon satisfactory completion of the requirements of Regulation .03A—H, the promoter shall be issued a permit to conduct an outdoor music festival by the deputy State health officer of the county in which the festival is to be held.

.07 Presentation of Permits.

Once the promoter has obtained two permits, one from the deputy State health officer and one from the State Police commanding officer, the applicant may present both permits to the deputy State health officer of the county or the Office of Licenses and Permits for a license.

Administrative History

Effective date: January 25, 1980 (7:2 Md. R. 115)

REVISOR'S NOTE

This section is new language derived without substantive change from the fourth sentence of former Art. 56, § 17A.

Defined terms:
"Harford County juke box license" § 17-1312
"Person" § 1-101

Subtitle 14. Promoters of Outdoor Musical Festivals.

§ 17-1401. Definitions.

(a) *In general.* — In this subtitle the following words have the meanings indicated.

REVISOR'S NOTE

This subsection is new language used as the standard introductory language to a definition section.

(b) *Health officer.* — "Health officer" means the health officer for the county where an outdoor musical festival will be held.

REVISOR'S NOTE

This subsection is new language added to avoid repetition of the phrase "health officer for the county where an outdoor musical festival will be held".

Defined terms:
"County" § 1-101
"Outdoor musical festival" § 17-1401

(c) *Outdoor musical festival.* — "Outdoor musical festival" means an event at which a group of individuals participates in musical entertainment:

(1) in an open space;

(2) not in a permanent structure; and

(3) not on publicly owned property.

REVISOR'S NOTE

This subsection is new language derived without substantive change from former Art. 56, § 159(a).

(d) *Promoter.* — (1) "Promoter" means a person who:

(i) organizes, operates, produces, or stages an outdoor musical festival; or

(ii) owns or leases property where an outdoor musical festival is held.

(2) "Promoter" does not include the State or a political subdivision of the State.

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REVISOR'S NOTE

This subsection is new language derived without substantive change from former Art. 56, § 159(b) and, as it related to organizing, producing, or staging an outdoor musical festival, § 159B(a).

Defined terms:
"Outdoor musical festival" § 17-1401
"Person" § 1-101

(e) *Promoter license.* — "Promoter license" means a license issued by the clerk to act as a promoter.

REVISOR'S NOTE

This subsection is new language added to avoid repetition of phrases such as "license to act as a promoter".

Defined terms:
"Clerk" § 1-101
"Promoter" § 17-1401

(An. Code 1957, art. 56, §§ 159, 159B; 1992, ch. 4, § 2.)

§ 17-1402. Scope of subtitle.

(a) *Applicability to counties — In general.* — This subtitle does not apply in Baltimore City or Allegany, Howard, and Montgomery Counties.

(b) *Same — Certain promoters.* — This subtitle does not apply to an outdoor musical festival held in:

(1) Carroll County by a college or public school; or

(2) Kent County by a not for profit agricultural, charitable, civic, fraternal, religious, social welfare, or war veterans' organization operating in Kent County.

(c) *Same — Number in attendance.* — (1) In Anne Arundel, Baltimore, Calvert, Caroline, Cecil, Charles, Dorchester, Garrett, Harford, Prince George's, Somerset, St. Mary's, Talbot, Wicomico, and Worcester Counties, this subtitle applies only to an outdoor musical festival with 1,000 or more spectators in attendance.

(2) In Carroll, Frederick, Kent, Queen Anne's, and Washington Counties, this subtitle applies only to an outdoor musical festival with 500 or more spectators in attendance.

(d) *Admission charged.* — This subtitle applies only if admission is charged to attend the outdoor musical festival. (An. Code 1957, art. 56, §§ 159, 159A, 159B, 159E; 1992, ch. 4, § 2.)

REVISOR'S NOTE

This section is new language derived without substantive change from former Art. 56, §§ 159(c), 159A(d), 159E(a), and, as it related to the number in attendance and paying an admission charge, § 159B(a).

Subsection (a) of this section is revised to state what counties are excluded from this subtitle, rather than those that are covered by this subtitle, for brevity.

Subsection (c) of this section is revised as a scope provision relating to the number of spectators in attendance, rather than a definition of the term "spectator", for clarity.

Defined term:
"Outdoor musical festival" § 17-1401

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§ 17-1403. License required.

Except as otherwise provided in this subtitle, a person must have a promoter license whenever the person acts as a promoter in the State. (An. Code 1957, art. 56, § 159B; 1992, ch. 4, § 2.)

REVISOR'S NOTE

This section is new language derived without substantive change from the first sentence of former Art. 56, § 159B(b), except as it related to the amount of the license tax.

It is rephrased in standard language to state affirmatively that a person must be licensed to act as a promoter in the State.

Defined terms:

"Person"	§ 1-101
"Promoter"	§ 17-1401
"Promoter license"	§ 17-1401

§ 17-1404. Applications for licenses.

(a) *In general.* — An applicant for a promoter license shall:

(1) pay to the clerk a license fee of $500;

(2) get a health permit from the health officer; and

(3) get a safety permit from the Superintendent of State Police.

(b) *Health permit.* — An applicant for a health permit shall:

(1) post a bond in accordance with § 17-1405 of this subtitle;

(2) establish adequate health facilities and sanitation in accordance with any regulations adopted by the Department of Health and Mental Hygiene to govern outdoor musical festivals; and

(3) show that the applicant has obtained approval of the local law enforcement unit.

(c) *Safety permit.* — (1) An applicant for a safety permit shall show that the applicant has provided:

(i) adequate security for the safety of spectators and their property;

(ii) adequate arrangements for the orderly flow of traffic to, at, and from the outdoor musical festival; and

(iii) adequate security for those persons who might reasonably be affected by the outdoor musical festival and for their property.

(2) Paragraph (1)(iii) of this subsection does not apply in St. Mary's County. (An. Code 1957, art. 56, §§ 159A, 159B, 159C; 1992, ch. 4, § 2.)

REVISOR'S NOTE

This section is new language derived without substantive change from former Art. 56, § 159C, § 159A(a), (c), and (b)(1)(ii), (iii), and, as it related to the requirement of a bond, (i), and the first sentence of § 159B(b), as it related to the amount of the license tax.

In subsection (b)(2) of this section, the former reference to "medical" facilities is deleted as included in the reference to "health" facilities.

Defined terms:

"Clerk"	§ 1-101
"Health officer"	§ 17-1401
"Outdoor musical festival"	§ 17-1401
"Person"	§ 1-101
"Promoter license"	§ 17-1401

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§ 17-1405. Bond.

(a) *Scope of section.* — In St. Mary's County, this section does not apply if the promoter owns the property where the outdoor musical festival will be held.

(b) *Required.* — (1) Except as provided in paragraph (3) of this subsection, each promoter shall post a cash bond with the application for a health permit.

(2) The amount of the bond:

(i) shall be determined by the health officer; but

(ii) may not exceed:

1. $25,000 in Frederick and Washington Counties; or
2. $50,000 in the other counties to which this subtitle applies.

(3) In St. Mary's County, a promoter may pledge real or personal property instead of posting a cash bond if the promoter submits to the health officer a verified financial statement confirming that the fair market value of the pledged property equals or exceeds the amount of the bond required.

(c) *Bond to be kept for 30 days.* — The health officer:

(1) shall keep the bond until 30 days after the end of the outdoor musical festival; and

(2) after that time, shall return to the promoter any money that has not been used and is not needed to satisfy pending claims.

(d) *Use of bond — Failure to repair damage or remove trash.* — If, within 72 hours after an outdoor musical festival ends, the promoter fails to remove all trash, and to begin repair of any damage to property, including crops and livestock, that the outdoor musical festival or its spectators caused or created, the health officer may use as much of the bond as necessary to remove the trash and repair the damage.

(e) *Same — Claims against bond.* — (1) This subsection does not affect any common law remedy that the person has against the promoter.

(2) Any person who has a claim against the bond shall submit the claim to the health officer within 30 days after the outdoor musical festival ends.

(3) If a claim is submitted, the health officer shall determine and keep the amount necessary to cover the claim. (An. Code 1957, art. 56, §§ 159A, 159E; 1992, ch. 4, § 2.)

REVISOR'S NOTE

This section is new language derived without substantive change from former Art. 56, §§ 159A(b)(1)(i) and (2) and 159E(b).

In subsection (d) of this section, the former words "debris" and "residue" are deleted as included in the term "trash".

Defined terms:

"County"	§ 1-101
"Health officer"	§ 17-1401
"Outdoor musical festival"	§ 17-1401
"Person"	§ 1-101
"Promoter"	§ 17-1401

§ 17-1406. Record fee.

Notwithstanding the license fee imposed under this subtitle, the Maryland State Police may charge an applicant for a promoter license a fee of not more than $12 to cover the costs of securing records from a source other than the State Police. (An. Code 1957, art. 56, § 159B; 1992, ch. 4, § 2.)

REVISOR'S NOTE

This section is new language derived without substantive change from the second sentence of former Art. 56, § 159B(b).

Defined term:
"Promoter license" § 17-1401

§ 17-1407. Acting as promoter without license.

(a) *Prohibited act.* — Except as otherwise provided in this subtitle, a person may not act as a promoter in the State unless the person has a promoter license.

(b) *Penalty.* — A person who violates this section is guilty of a misdemeanor and, on conviction, is subject to a fine not exceeding $5,000 or imprisonment not exceeding 6 months or both. (An. Code 1957, art. 56, § 159D; 1992, ch. 4, § 2.)

REVISOR'S NOTE

This section is new language derived without substantive change from former Art. 56, § 159D.

In subsection (a) of this section, the former word "advertises" is deleted as included in what a promoter does when acting as a promoter. See § 17-1401(d) of this subtitle.

As to the deletion, in subsection (b) of this section, of the former minimum penalty of $3,000, see the General Revisor's Note to this article.

Defined terms:
"Person" § 1-101
"Promoter" § 17-1401
"Promoter license" § 17-1401

Subtitle 15. Plumbers and Gas Fitters.

§ 17-1501. "Plumber's license" defined.

In this subtitle, "plumber's license" means a license issued by the clerk to do business as a plumber or gas fitter. (1992, ch. 4, § 2.)

REVISOR'S NOTE

This section is new language added to avoid repetition of phrases such as "license to do business as a plumber or gas fitter".

Defined term:
"Clerk" § 1-101

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§ 157L. Penalty; exception.

Repealed by Acts 1992, ch. 4, § 1, effective October 1, 1992.

§ 157N. False statement.

Repealed by Acts 1992, ch. 4, § 1, effective October 1, 1992.

VAUDEVILLE SHOWS AND CARNIVALS

§ 158A. Assumption of risk.

Repealed by Acts 1992, ch. 4, § 1, effective October 1, 1992.

Editor's note. — Section 1, ch. 4, Acts 1992, also repealed the subtitle heading "Vaudeville Shows and Carnivals."

OUTDOOR MUSIC FESTIVALS

§§ 159, 159A-159E. Outdoor music festivals.

Repealed by Acts 1992, ch. 4, § 1, effective October 1, 1992.

Editor's note. — Section 1, ch. 4, Acts 1992, also repealed the subtitle heading "Outdoor Music Festivals."

GARAGES

§ 160. Fees.

Repealed by Acts 1992, ch. 4, § 1, effective October 1, 1992.

Editor's note. — Section 1, ch. 4, Acts 1992, also repealed the subtitle heading "Garages."

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Title 26
DEPARTMENT OF THE ENVIRONMENT

Subtitle 02 OCCUPATIONAL, INDUSTRIAL, AND RESIDENTIAL

Chapter 03 Control of Noise Pollution

Authority: Environment Article, §3-401, Annotated Code of Maryland

Preface

The Environmental Noise Act of 1974 of the State of Maryland declares as policy the limitation of noise to that level which will protect the health, general welfare, and property of the people of the State. It requires that the Department assume responsibility for the jurisdiction over the level of noise, and prepare regulations for the control of noise, including the establishment of standards for ambient noise levels and equipment performance with respect to noise, for adoption by the Secretary of the Environment. Enforcement of the regulations and standards is the responsibility of the Department in all areas, using the facilities and services of local agencies within the areas to the greatest extent possible. The Department shall coordinate the programs of all State agencies relating to noise abatement, and each State agency prescribing sound level limits or regulations respecting noise shall obtain the endorsement of the Department in prescribing any limits or regulations.

.01 Definitions.

A. "ANSI" means American National Standards Institute or its successor bodies.

B. "Construction" means any site preparation, assembly, erection, repair, alteration, or similar activity.

C. "Day-night average sound level (L_{dn})" means in decibels, the energy average sound level for a 24-hour day with a 10 decibel penalty applied to noise occurring during the nighttime period; i.e., noise levels occurring during the period from 10 p.m. one day until 7 a.m. the next are treated as though they were 10 dBA higher than they actually are. The use of the A-weighting is understood. The mathematical expression for L_{dn} is as follows:

$$L_{dn} = 10 \log_{10} \left[\left(\frac{15}{24}\right) 10^{L_d - 10} + \left(\frac{9}{24}\right) 10^{(L_n + 10) - 10} \right]$$

where L_d = The daytime average sound level.

L_n = The nighttime average sound level.

D. "dBA" means abbreviation for the sound level in decibels determined by the A-weighting network of a sound level meter or by calculation from octave band or one-third octave band data.

E. "Daytime hours" means 7 a.m. to 10 p.m., local time.

F. "Decibel (dB)" means a unit of measure equal to ten times the logarithm to the base ten of the ratio of a particular sound pressure squared to a standard reference pressure squared. For the purpose of this subtitle, 20 micropascals shall be the standard reference pressure.

G. "Demolition" means any dismantling, destruction, or removal activities.

H. "Department" means the Department of the Environment.

I. "Emergency" means any occurrence or set of circumstances involving actual or imminent physical trauma or property damage which demands immediate action.

J. "Environmental noise" means the noise that exists at any location from all sources.

K. "Environmental noise standards" means the goals for environmental noise, the attainment and maintenance of which, in defined areas and under specific conditions, are necessary to protect the public health and general welfare.

L. "Equivalent sound level" (also "average sound level") means the level of a constant sound which, in a given situation and time period, would convey the same sound energy as does the actual time-varying sound during the same period. Equivalent sound level is the level of the time weighted, mean-square, A-weighted sound pressure. A numerical subscript may be used to indicate the time period under consideration; i.e., $L_{eq}(24)$ or $L_{eq}(8)$ for 24-hour and 8-hour periods, respectively. No subscript indicates a 24-hour period. The mathematical expression for the L_{eq} is as follows:

$$L^{eq} = 10 \log_{10} \left[\frac{1}{t_2 - t_1} \int_{t_1}^{t_2} 10^{L_A(t)/10} \, dt \right] \text{ dBA}$$

where t_1 and t_2 are the beginning and ending times, respectively, of the period over which the average is determined, and $L_A(t)$ is the instantaneous A-weighted sound pressure level fluctuating with time.

M. "Nighttime hours" means 10 p.m. to 7 a.m., local time.

N. "Noise" means the intensity, frequency, duration, and character of sound, including sound and vibration of sub-audible frequencies.

O. "Noise pollution" means the presence of noise of sufficient loudness, character, and duration, which whether from a single source or multiple sources, is, or may be predicted with reasonable certainty to be, injurious to health or which unreasonably interferes with the proper enjoyment of property or with any lawful business or activity.

P. "Periodic noise" means noise possessing a repetitive on-and-off characteristic.

Q. "Person" means any individual, group of individuals, firm, partnership, voluntary association, or private, public, or municipal corporation, or political subdivision of the State, or department, bureau, agency, or instrument of federal, State, or local government, responsible for the use of property.

R. "Prominent discrete tone" means any sound which can be distinctly heard as a single pitch or a set of single pitches. For the purposes of this regulation, a prominent discrete tone shall exist if the one-third octave band sound pressure level in the band with the tone exceeds the arithmetic average of the sound pressure levels of the 2 contiguous one-third octave bands by 5 dB for center frequencies of 500 Hz and above and by 8 dB for center frequencies between 160 and 400 Hz and by 15 dB for center frequencies less than or equal to 125 Hz.

S. "Sound level" means, in decibels, the weighted sound pressure level measured by the use of a sound level meter satisfying the requirements of ANSI S1.4 1971 "Specifications for Sound Level Meters". Sound level and noise level are synonymous. The weighting employed shall always be specified.

T. "Sound level meter" means an instrument, meeting ANSI S1.4 1971 "Specifications for Sound Level Meters", comprising a microphone, an amplifier, an output meter, and frequency-weighting network(s) that is used for the measurement of sound pressure levels in a specified manner.

U. Sound Pressure.

(1) "Sound pressure" means the minute fluctuations in atmospheric pressure which accompany the passage of a sound wave.

(2) For a steady sound, the value of the sound pressure average over a period of time.

(3) Sound pressure is usually measured in dynes per square centimeter (dyne/cm^2), or in newtons per square meter (N/m^2), or in micropascals.

V. "Sound pressure level" means, in decibels, 20 times the logarithm to the base ten of the ratio of a sound pressure to the reference sound pressure of 20 micropascals (20 micronewtons per square meter). In the absence of any modifier, the level is understood to be that of a root-mean-square pressure.

W. "Source" means any person or property, real or personal, contributing to noise pollution.

X. "Vibration" means any oscillatory motion of solid bodies.

Y. "Zoning district" means a general land use category, defined according to local subdivision, the activities and uses for which are generally uniform throughout the subdivision. For the purposes of this regulation, property which is not zoned "residential", "commercial", or "industrial", shall be classified according to use as follows:

(1) "Commercial" means property used for buying and selling goods and services;

(2) "Industrial" means property used for manufacturing and storing goods;

(3) "Residential" means property used for dwellings.

.02 Environmental Noise Standards.

A. Precepts.

(1) It is known that noise above certain levels is harmful to the health of humans. Although precise levels at which all adverse health effects occur have not definitely been ascertained, it is known that one's well-being can be affected by noise through loss of sleep, speech interference, hearing impairment, and a variety of other psychological and physiological factors. The establishment of ambient noise standards, or goals, must provide margins of safety in reaching conclusions based on available data which relate noise exposure to health and welfare effects, with due consideration to technical and economic factors.

(2) The environmental noise standards set forth here represent goals expressed in terms of equivalent A-weighted sound levels which are protective of the public health and welfare. The ambient noise levels shall be achieved through application, under provisions of laws or regulations or otherwise, of means for reducing noise levels including, but not limited to, isolation of noise producing equipment, dampening of sound waves by insulation, equipment modification and redesign, and land use management.

B. Standards for Environmental Noise—General.

(1) The standards are goals for the attainment of an adequate environment. The standards set out in Regulation .03 are intended to achieve these goals.

(2) The following sound levels represent the standards for the State by general zoning district:

Table 1
Environmental Noise Standards

Zoning District	*Level*	*Measure*
Industrial	70 dBA	$L_{eq}(24)$
Commercial	64 dBA	L_{dn}
Residential	55 dBA	L_{dn}

.03 General Regulations.

A. Noise and Vibration Prohibitions.

(1) A person may not cause or permit noise levels which exceed those specified in Table 2 except as provided in §A(2) or (3), or §B, below.

Table 2
Maximum Allowable Noise Levels (dBA)
for Receiving Land Use Categories

Effective Date	*Day/Night*	*Industrial*	*Commercial*	*Residential*
Upon Adoption	Day	75	67	65
	Night	75	62	55

(2) A person may not cause or permit noise levels emanating from construction or demolition site activities which exceed:

(a) 90 dBA during daytime hours;

(b) The levels specified in Table 2 during nighttime hours.

(3) A person may not cause or permit the emission of prominent discrete tones and periodic noises which exceed a level which is 5 dBA lower than the applicable level listed in Table 2.

(4) A person may not cause or permit, beyond the property line of a source, vibration of sufficient intensity to cause another person to be aware of the vibration by such direct means as sensation of touch or visual observation of moving objects. The observer shall be located at or within the property line of the receiving property when vibration determinations are made.

B. Exemptions.

(1) The provisions of this regulation may not apply to devices used solely for the purpose of warning, protecting, or alerting the public, or some segment thereof, of the existence of an emergency situation.

(2) The provisions of this regulation do not apply to the following:

(a) Household tools and portable appliances in normal usage.

(b) Lawn care and snow removal equipment (daytime only) when used and maintained in accordance with the manufacturer's specifications.

(c) Agricultural field machinery when used and maintained in accordance with manufacturer's specifications.

(d) Blasting operations for demolition, construction, and mining or quarrying (daytime only).

(e) Motor vehicles on public roads.

(f) Aircraft and related airport operations at airports licensed by the State Aviation Administration.

(g) Boats on State waters or motor vehicles on State lands under the jurisdiction of the Department of Natural Resources.

(h) Emergency operations.

(i) Pile driving equipment during the daytime hours of 8 a.m. to 5 p.m.

(j) Sound not electronically amplified created by sporting, amusement, and entertainment events and other public gatherings operating according to terms and conditions of the appropriate local jurisdictional body. This includes but is not limited to athletic contests, amusement parks, carnivals, fairgrounds, sanctioned auto racing facili-

ties, parades, and public celebrations. This exemption only applies between the hours of 7 a.m. and 12 midnight.

(k) Rapid rail transit vehicles and railroads.

(l) Construction and repair work on public property.

(m) Air conditioning or heat pump equipment used to cool or heat housing on residential property. For this equipment, a person may not cause or permit noise levels which exceed 70 dBA for air conditioning equipment at receiving residential property and 75 dBA for heat pump equipment at receiving residential property.

C. Variance Procedure.

(1) Any person who believes that meeting the requirements of §A, above, is not practical in a particular case may request an exception to its requirements.

(2) Requests submitted to the Department shall be in writing and shall include evidence to show that compliance is not practical.

(3) Upon receipt of a request for an exception, the Department shall schedule a hearing to be held within 60 days.

(4) The applicant for the exception, at least 30 days before the hearing date, shall advertise prominently the hearing by placing a notice in a newspaper of general circulation in the subdivision in which the facility or source for which the exception is sought is located. The notice shall include the name of the facility or source and such additional information as the Department may require.

(5) Based upon evidence presented at the hearing, the Secretary may grant an exception to §A, above, for a period not to exceed 5 years under terms and conditions appropriate to reduce the impact of the exception.

(6) Exceptions shall be renewable upon receipt by the Department of evidence that conditions under which the exception was originally granted have not changed significantly.

D. Measurement.

(1) The equipment and techniques employed in the measurement of noise levels may be those recommended by the Department, which may, but need not, refer to currently accepted standards or recognized organizations, including, but not limited to, the American National Standards Institute (ANSI), American Society for Testing and Materi-

als (ASTM), Society of Automotive Engineers (SAE), and the United States Environmental Protection Agency (EPA).

(2) The measurement of noise levels shall be conducted at points on or within the property line of the receiving property or the boundary of a zoning district, and may be conducted at any point for the determination of identity in multiple source situations.

(3) Sound level meters used to determine compliance with Regulation .03 shall meet or exceed the specifications of the American National Standards Institute or its successor bodies ANSI S1.4-1971 for Type II sound level meters.

.04 Emission Regulations.

Reserved.

.05 Penalties.

A. Civil Penalty. Any person who willfully violates these regulations shall be liable to a civil penalty of not more than $10,000. Each day during which a violation continues there shall be liability for a separate penalty.

B. Plan for Compliance. A violator who has submitted a plan for compliance with these regulations and has that plan or amendments to it approved by the Secretary, upon recommendation of the Department, may not be considered to be in violation of these regulations as long as he acts in accordance with the original or amended plan.

Administrative History

Effective date: August 6, 1975 (2:17 Md. R. 1189)

Regulation .01A-1, W-1 adopted effective February 15, 1982 (9:3 Md. R. 222); repealed effective March 28, 1983 (10:6 Md. R. 558)

Regulations .01 and .03A, B, D amended effective September 14, 1977 (4:19 Md. R. 1468)

Regulation .01C amended effective March 28, 1983 (10:6 Md. R. 558)

Regulations .01C, Q; .02B; .03B, D amended effective February 15, 1982 (9:3 Md. R. 222)

Regulation .03A amended as an emergency provision effective November 13, 1979 (6:24 Md. R. 1917); emergency status expired March 29, 1980

Regulation .03A and B amended effective March 28, 1983 (10:6 Md. R. 558)

Regulation .04 repealed effective September 14, 1977 (4:19 Md. R. 1468)

Chapter recodified from COMAR 10.20.01 to COMAR 26.02.03

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MARYLAND DEPARTMENT OF THE ENVIRONMENT
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Parris N. Glendening
Governor

Jane T. Nishida
Secretary

MEMORANDUM

TO: **Environmental Noise Advisory Council**
Interagency Noise Control Committee

FROM: **Robin Grove, Deputy Director**
Technical and Regulatory Services Administration
Chair, Interagency Noise Control Committee

DATE: **January 24, 2001**

RE: **Agenda for February 5, 2001 Meeting; Draft Minutes of December 11, 2000 Meeting**

Attached are the agenda for the first formal meeting of the Environmental Noise Advisory Council, and the Interagency Noise Control Committee, and the minutes of the informal discussions held on December 11, 2000 at the MDE offices.

For members of the Environmental Noise Advisory Council, please come prepared to discuss nominations for chairman, vice chairman, and secretary of the Council to be appointed by Secretary Jane T. Nishida.

As a reminder, we will be meeting on February 5, 2001, from 9:30 AM to 12:30 PM in the Susquehanna Room. Coffee, tea, juice and donuts will be provided. Also attached is a map showing the location of the MDE offices. For your convenience, parking space will be reserved at the south side of the 2400 building on a first-come, first-served basis.

ENVIRONMENTAL NOISE ADVISORY COUNCIL
AND
INTERAGENCY NOISE CONTROL COMMITTEE

INITIAL ORGANIZATIONAL MEETING
DRAFT MEETING MINUTES

December 11, 2000, 9:30 a.m.
Susquehanna Room
Maryland Department of the Environment

Attendees:

Environmental Noise Advisory Council
Stephen Epstein, M.D.
Fred Schmitz, Ph.D.
Nancy Benner
Delegate Jake Mohorovic

Interagency Noise Control Committee
Lt. Col. John F. Herbert
Robert A. Venezia, M.D.
Ken Polcak
Robin Grove
William Grabau

Guests:
E. Benjamin Miller (attending as a non-voting representative for Michael Powell)

MDE Staff
George Harman
Bill Parrish
Dave Jarinko
Diane Shaw
Robert Field, Esq.

Agenda:
See the attached meeting agenda.

Meeting Minutes:
1. Robin Grove stated that the purpose of the meeting was to provide initial organizational information to the new members of the Council and the Interagency Noise Control Committee (the "Committee"). He advised that there would not be a discussion of substantive issues relating to the regulation of noise pollution at this meeting. He also advised that future regular meetings of the Council involving

discussion of such issues would be advertised in the *Maryland Register.*

3. Mr. Grove opened the meeting with introductions of the Council and Committee members, guests, and MDE staff. Mr. Grove also reviewed the charge of the Council and the Committee. Neither body has met for several years. State noise control law requires the Committee to meet at least twice a year. The Committee serves internally within State government to address changes needed in regulations. The Council meets at the times that the Secretary or Council chairman determine. The Council serves as an advisory body on changes to the noise pollution statute. A number of issues have arisen over the past year that the Secretary needs to address. As a result, the Secretary requests the advice of both bodies on proposed statutory and regulatory amendments needed to address these issues.
4. Bill Parrish made a presentation on definitions of terms used in measurement and regulation of noise pollution. During discussion, Dave Jarinko emphasized that MDE's approach in enforcement of State noise standards is to first, try to resolve complainant problems through voluntary and technical assistance. In the event that voluntary measures are not successful, formal enforcement actions can be taken. Mr. Jarinko noted that MDE responds to between 120 and 150 noise complaints each year. One staff member must handle these complaints on a state-wide basis.
5. George Harman made a presentation on the existing noise control statute and regulations, and summarized some of the changes being considered by the Secretary. Copies of slides used in the presentation were distributed to the members. Dr. Epstein expressed concern that noise exposure is a major health issue, not just a nuisance. He encouraged the Council and Committee to address overall noise exposure in addition to standards from particular sources.
6. Mr. Grove discussed the need for the Secretary to appoint the Chair, Vice Chair and Secretary of the Council. He asked if any of the Council members wished to volunteer for these positions. There being none, it was decided that the matter would be discussed at the following meeting. Mr. Field advised that this would be appropriate at the first formal meeting of the Council. He also advised that the Council is required in the statute to respond to the Secretary within 60 days after receiving a proposed noise standard or sound level limit from the Department for consideration.
7. Mr. Harman suggested that the Council consider to a process for allowing public input at future meetings.
8. The Council and Committee members decided that the first official joint meeting would be on February 5, 2001. Future meetings will be held on the first Monday of each month for the immediate future. The frequency of meetings can be adjusted depending on the need.

Members not in attendance:

Environmental Noise Advisory Council
Ilene Busch-Vishniac, Ph.D.
Michael Powell, Esq.

Interagency Noise Control Committee
Jesse Heier

SENATE BILL 869

Unofficial Copy
D3

2001 Regular Session
1lr2735

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By: **Senators Jimeno, Miller, Collins, DeGrange, and Middleton**
Introduced and read first time: February 26, 2001
Assigned to: Rules

A BILL ENTITLED

AN ACT concerning

Sound Level Limits and Noise Control - Shooting Sports Clubs

FOR the purpose of repealing a limitation on a certain exemption from certain sound level limits and noise control rules and regulations to make the exemption apply to certain sports shooting clubs established after a certain date.

BY repealing and reenacting, with amendments,
Article - Environment
Section 3-105(a)(3) and 3-401(c)(5)
Annotated Code of Maryland
(1996 Replacement Volume and 2000 Supplement)

SECTION 1. BE IT ENACTED BY THE GENERAL ASSEMBLY OF MARYLAND, That the Laws of Maryland read as follows:

Article - Environment

3-105.

(3) (i) A political subdivision may not adopt any noise control ordinance, rule, or regulation, including the environmental noise standards, sound level limits, and noise control rules and regulations adopted under this title, that prohibits trapshooting, skeetshooting, or other target shooting between the hours of 9 a.m. and 10 p.m. by a shooting sports club [that is chartered and in operation as of July 1, 1983. However, this prohibition does not apply if the sports shooting club moves to a parcel of land that is not contiguous to the location of the club on July 1, 1983].

(ii) This paragraph does not apply in Allegany, Baltimore City, Calvert, Charles, Garrett, Howard, Montgomery, St. Mary's, and Washington counties.

3-401.

(c) (5) (i) The sound level limits and noise control rules and regulations adopted under this subsection may not prohibit trapshooting, skeetshooting, or other

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target shooting between the hours of 9 a.m. and 10 p.m. on any range or other property of a shooting sports club [that is chartered and in operation as of July 1, 1983. However, this prohibition does not apply if the sports shooting club moves to a parcel of land that is not contiguous to the location of the club on July 1, 1983].

(ii) This paragraph does not apply in Allegany, Anne Arundel, Baltimore City, Calvert, Charles, Garrett, Howard, Montgomery, St. Mary's, and Washington counties.

SECTION 2. AND BE IT FURTHER ENACTED, That this Act shall take effect October 1, 2001.

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MEETING TO RECONVENE

THE

ENVIRONMENTAL NOISE ADVISORY COUNCIL

AND THE

INTERAGENCY NOISE CONTROL COMMITTEE

TO PROVIDE ADVICE ON PROPOSED NOISE STANDARDS

December 11, 2000

Susquehanna Conference Room

Maryland Department of the Environment
2500 Broening Highway
Baltimore, MD 21224

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MEETING AGENDA

Environmental Noise Advisory Council
and the
Interagency Noise Control Committee

December 11, 2000
9:30 AM to 12 Noon
Susquehanna Room

9:30 Introductions; Review Agenda .....Robin Grove

9:45 Charge to Council and Committee .....Robin Grove

10:00 Review of Noise Control Principles and Practices.....Bill Parrish

10:45 Break

11:00 Overview of Statutory and Regulatory Issues.....George Harman

11:30 Overview of Proposed Amendments to Statute and Regulation....G.Harman

11:45 Next and Future Meeting Dates.....Robin Grove

12:00 Public Comment and Discussion.....Open

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ENVIRONMENTAL NOISE ADVISORY COUNCIL

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Recommended Amendments/Changes

Title 26
Department of the Environment
Subtitle 02 Occupational, Industrial, And Residential Hazards
Chapter 03 Control Of Noise Pollution

The following amendments/changes are being recommended to clarify and update the noise control regulations.

CURRENT

Annotated Code of Maryland
3-101 Definitions (d)

(d) Environmental noise standards - "Environmental noise standard" means a goal for the limitation of noise, from all sources, that exists in a defined area under specified conditions.

CHANGE

3-101 Definitions (d)

(d) "Environmental noise standards" means the A-weighted intruding sound level limits for the attainment of an adequate environment. The standards are intended to protect the public health and general welfare.

RATIONALE

This change is recommended to remove any confusion or doubt regarding the status of the conflicting terminology "Environmental noise standard" means a goal. This change will remove the term goal leaving standards to be operative and enforceable terminology.

Regulatory Consideration #1

CURRENT

.01 Definitions - J.

J. "Environmental noise standards" means the goals for environmental noise, the attainment and maintenance of which, in defined areas and under specific conditions, are necessary to protect the public health and general welfare.

CHANGE

J. "Environmental noise standards" means the A-weighted sound level limits for intruding noise, the attainment and maintenance of which, in defined areas and under specific conditions, are necessary to protect the public health and general welfare.

RATIONALE

This change is recommended to remove the conflict and confusion regarding the terminology **standards** means **goals**. By removing the word **goals** the word standards will become the operative and enforceable terminology.

CURRENT

.02 A Precepts (1)

(1) It is known that noise above certain levels is harmful to the health of humans. Although precise levels at which all adverse health effects occur have not been ascertained, it is known that one's well-being can be affected by noise through the loss of sleep, speech interference ,hearing impairment, and a variety of other psychological and physiological factors. The establishment of ambient noise standards, or goals, must provide margins of safety in reaching conclusions based on available data which relate noise exposure to health and welfare effects, with due consideration to technical and economic factors.

CHANGE

.02 A. Precepts (1)

(1) It is known that noise above certain levels is harmful to the health of humans. Although precise levels at which all adverse health effects occur have not definitely been ascertained, it is known that one's well-being can be affected by noise through loss of sleep, speech interference, hearing impairment, and a variety of other psychological and physiological factors. The establishment of ambient noise standards must provide margins of safety in reaching conclusions based on available data which relate noise exposure to health and welfare effects, with due consideration to technical and economic factors.

RATIONALE

This change is recommended to resolve the confusion and conflict that arises from having the contradictory terminology, "Standards or Goals", in the same sentence. This change will eliminate the word "goals" leaving standards to be the operative and enforceable term.

CURRENT

.02 A. Precepts (2)
(2) The environmental noise standards set forth here represent goals expressed in terms of equivalent A-weighted sound levels which are protective of the public health and welfare. The ambient noise levels shall be achieved through application , under provisions of laws or regulations or otherwise, of means for reducing noise levels including , but not limited to, isolation of noise producing equipment, dampening of sound waves by insulation, equipment modification and redesign, and land use management.

CHANGE

.02 A Precepts (2)
(2) The environmental noise standards set forth here represent equivalent A-weighted sound level limits which are protective of the public health and welfare. The ambient noise levels shall be achieved through application, under provisions of laws or regulations or otherwise, the means for reducing noise levels including, but not limited to, isolation of noise producing equipment, dampening of sound waves by insulation, equipment modification and redesign, and land use management.

RATIONALE

This change is recommended to avoid potential conflict and confusion by having the conflicting terminology "Standards represent Goals" in this section. This change removes the term "goals" leaving Standards to be the operative and enforceable terminology.

Regulatory Consideration #4

CURRENT

.02 B. Standards for Environmental Noise - General

(1) The standards are goals for the attainment of an adequate environment. The standards set out in Regulation .03 are intended to achieve these goals.

CHANGE

.02 B. Standards for Environmental Noise - General

(1) The standards are A-weighted intruding sound level limits for the attainment of an adequate environment. The standards set out in Regulation .03 are intended to protect the public health and general welfare.

RATIONALE

This change is recommended to remove any confusion regarding the terminology "Standards are Goals" and to make **Tables 1** and **2** enforceable standards with no doubt or confusion as to non-enforceable "goal status".

Regulatory Consideration #5

CURRENT

Table 1
Environmental Noise Standards

CHANGE

Table 1
Noise Producing Equipment Standards

RATIONALE

This change is recommended to make **table 1** an enforceable standard for equipment produced noise as opposed to a generalized attainment goal.

Regulatory Consideration #6

CURRENT

New Definition Recommended

CHANGE

.01 Definition - Z.

Z. Mobile agriculture field equipment - means field equipment whose primary function is accomplished while in motion - such as tractors, trucks, wagons, plows, spreaders, combines, and the like.

RATIONALE

This definition is recommended to clarify the term "agricultural field machinery" and to separate mobile [trucks, tractors, combines, balers etc.] from stationary and fixed field machinery (pumps, generators, sound cannons, chillers, grain dryers etc.) which are often installed and operated with no or inadequate sound muffling devices, frequently operating 24 hours a day for extended periods of time adversely impacting adjoining residential properties.

CURRENT

New Definition Recommended

CHANGE

.01 Definitions - AA.

AA. Stationary agricultural field machinery - means equipment that is used primarily at a fixed location for extended periods of time. This equipment would include but not be limited to: pumps, generators, chillers and grain drying equipment.

RATIONALE

This definition is recommended to clarify the term "agricultural field machinery" and to separate mobile [trucks, tractors, combines, balers etc.] from stationary and fixed field machinery [pumps, generators, sound cannons, chillers grain dryers, etc.] which are often installed and operated with no or inadequate sound muffling devices , frequently operating 24 hours a day for extended periods of time adversely impacting adjoining residential properties.

Regulatory Consideration #8

CURRENT

.03 B. Exemptions (2) (c)

(c) Agricultural field machinery when used and maintained in accordance with the manufacture's specifications.

CHANGE

.03 B. Exemptions

(c) Sound from mobile agricultural field machinery when used and maintained in accordance with the manufacture's specifications.

RATIONALE

This amendment is recommended to clarify the term agricultural field machinery and to separate mobile (trucks, tractors, combines, balers etc.) from stationary and fixed field machinery (pumps, generators, sound cannons, chillers, grain dryers etc.) which are often installed and operated with no or inadequate sound muffling devices, frequently operating 24 hours a day for extended periods of time adversely impacting adjoining residential properties.

Regulatory Consideration #9

CURRENT

.01 Definitions - P.

P. Periodic means noise possessing a repetitive on-and-off characteristic.

CHANGE

.01 Definitions - P

P. "Periodic and Impulse noise" means noise possessing an on-and-off characteristic with a rapid rise to peak and a short decay not exceeding 2 seconds.

RATIONALE

The term Impulse and the additional language needs to be added to this definition to make it conform to recognized acoustic terminology for these quick sound events having a rapid rise to peak and a short decay of less than 2 seconds, (more specifically referred to as Impulse noise).

Regulatory Consideration #10

CURRENT

Table 2
Maximum Allowable Noise Levels (dBA)
For Receiving Land Use Categories

CHANGE

Table 2
Maximum Allowable Noise Levels (dBA)
For Receiving Land Use Categories
(measured as a Fast Lmax)

RATIONALE

This change is recommended to clarify and specify the measurement metric.

CURRENT

.03 B (2) (a)

(a) Household tools and portable appliances in normal usage.

CHANGE

.03 B. 2) (a)

(a) Household tools and portable appliances in normal usage during daytime hours.

RATIONALE

Certain household tools and appliances can be excessively loud and there is a need for these devices to be subject to the established night limit to protect the surrounding residential community during this period. This amendment language will not prohibit the use of such tools and appliances at night providing they are used in a manner that will comply with the 55 dBA night residential noise limit at a receiving residential property.

Regulatory Consideration #12

CURRENT

New Exemption Recommended

CHANGE

.03 B. Exemptions (2) (n)

(n) Household pets and animal sounds except when in connection with boarding/breeding kennels, animal hospitals and shelters.

RATIONALE

This amendment is needed to prevent State Noise Control inspectors from becoming involved in endless disputes between neighbors regarding household pets, (barking dogs). This issue is more appropriately addressed by animal control and elected officials at the local level.

Regulatory Consideration #13

CURRENT

New Definition Recommended

CHANGE

.01 Definitions - AB.

AB. Sporting event - means competitive athletic/sporting contests between teams or individuals, but does not for the purposes of this regulation include Trap shooting, skeet shooting, or other target shooting.

RATIONALE

This definition is recommended to reflect in the COMAR noise regulations the July 1,1983 amendment to the to the Annotated Code 3-401(5) (i) where gunshot noise is specifically addressed. Prior to this amendment gunshot noise was regarded as exempt as a "sporting event" exemption contained in the noise regulations (b. Exemptions) (j.).

CURRENT

.03 B. Exemptions (2) (j)

(j) Sound , not electronically amplified created by sporting events, amusements, and entertainment events and other public gatherings operating according to terms and conditions of the appropriate local jurisdictional body. This includes but is not limited to athletic contests, amusement parks carnivals, fairgrounds, sanctioned auto racing facilities, parades and public celebrations. This exemption only applies between the hours of 7am and midnight.

CHANGE

.03 B. Exemptions (2) (j)

(j) Sound, except those sounds that are electronically amplified, created by sporting events (except trap shooting, skeet shooting, or other target shooting), entertainment events and other public gatherings operating according to the terms and conditions of the appropriate local jurisdictional body. This exemption only applies between the hours of 7am and midnight.

RATIONALE

This change, along with, .03 B(2)(o) below, is needed to provide the distinction between general sporting event sounds and those associated with shooting that was intended by the 1983 amendment to the Statute . By separating the shooting exemption contained in the governing statute from other sporting events, the intent of the statute is more clearly presented.

The July 1,1983 provision of the Annotated Code, Environment 3, Noise Control, 3-401. (5) (i) (ii) specifically addresses the exemption status of "trap shooting, skeet shooting, or other target shooting". Prior to this July 1,1983 provision of the Annotated Code, shooting activity had been considered exempt between 7am and midnight under the COMAR 'sporting events" exemption.

Also the removal of the specific examples of exempted activities removes confusion regarding their total exemption from regulations. This provides for the reasonable application of controls on noise that can be applied to electronically amplified and other controllable noise sources.

CURRENT

New Exemption Recommended

CHANGE

.03 B. Exemptions (2) (o)
(o) Trapshooting, Skeet shooting, or other Target shooting between the hours of 9am and 10pm on any range or other property of a shooting sports club that is chartered and in operation as of July 1, 1983. However, this exemption does not apply if the sports shooting club moves to a parcel of land that is not contiguous to the location of the club on July 1, 1983. This exemption does not apply in Allegany, Ann Arundel, Baltimore City, Calvert, Charles, Garrett, Howard, Montgomery, St. Mary's and Washington Counties.

RATIONALE

This change brings COMAR Title 26.02.03 into conformance with the Annotated Code, Environment Title 3, Noise Control, 3-401, (5) (i) (ii) July 1, 1983 amendments which specifically addressed the exemption status of "trapshooting, skeet shooting, or other target shooting" "sporting event" exemption. The COMAR noise regulations were not, for whatever reason, amended to reflect this Annotated Code change causing confusion, misunderstanding and misinformation regarding the exemption status of gun clubs over the ensuing years. This change simply incorporates the language of the statute into the COMAR regulations.

CURRENT

Annotated Code of Maryland
3-401 (4) (i) (ii)

(4) The sound level limits and noise control rules and regulations adopted under this subsection shall be as follows for residential heat pumps and air conditioning units:

(i) Residential heat pumps	75 dBA
(ii) Residential air conditioning units	70 dBA

CHANGE

Repeal this section, (**3-401 (4) (i) (ii)**), in it's entirety.

RATIONALE

The 70 and 75dBA specified limits especially in a residential area at night are unreasonably high. Today's heat pump and air conditioning equipment can easily meet the established 55 and 65dBA residential limits if properly installed and maintained. There is no longer any justification for this excessive exemption level for this type of equipment in a residential area.

CURRENT

b. Exemptions (2) (m)

(m) Air conditioning or heat pump equipment used to cool or heat housing on residential property. For this equipment, a person may not cause or permit noise levels which exceed 70 dBA for air conditioning equipment at a receiving residential property and 75 dBA for heat pump equipment at a receiving residential property.

CHANGE

Repeal this exemption [**b. Exemptions (2) (m)**] in it's entirety.

RATIONALE

The 70 and 75 dBA exemption limits especially in a residential area at night are unreasonably high. Today's heat pump and air conditioning equipment can easily meet the established 55 and 65 dBA residential limits if properly installed and maintained. There is no longer any justification for this excessive exemption level for this type of equipment in a residential area.

Title 26
DEPARTMENT OF THE ENVIRONMENT

Subtitle 02 OCCUPATIONAL, INDUSTRIAL, AND RESIDENTIAL HAZARDS

Chapter 03 Control of Noise Pollution

Authority: Environment Article, §3-401,
Annotated Code of Maryland

Preface

The Environmental Noise Act of 1974 of the State of Maryland declares as policy the limitation of noise to that level which will protect the health, general welfare, and property of the people of the State. It requires that the Department assume responsibility for the jurisdiction over the level of noise, and prepare regulations for the control of noise, including the establishment of standards for ambient noise levels and equipment performance with respect to noise, for adoption by the Secretary of the Environment. Enforcement of the regulations and standards is the responsibility of the Department in all areas, using the facilities and services of local agencies within the areas to the greatest extent possible. The Department shall coordinate the programs of all State agencies relating to noise abatement, and each State agency prescribing sound level limits or regulations respecting noise shall obtain the endorsement of the Department in prescribing any limits or regulations.

.01 Definitions.

A. "ANSI" means American National Standards Institute or its successor bodies.

B. "Construction" means any site preparation, assembly, erection, repair, alteration, or similar activity.

C. "Day-night average sound level (L_{dn})" means in decibels, the energy average sound level for a 24-hour day with a 10 decibel penalty applied to noise occurring during the nighttime period; i.e., noise levels occurring during the period from 10 p.m. one day until 7 a.m. the next are treated as though they were 10 dBA higher than they actually are. The use of the A-weighting is understood. The mathematical expression for L_{dn} is as follows:

$$L_{dn} = 10 \log_{10} \left[\left(\frac{15}{24}\right) 10^{L_d + 10} + \left(\frac{9}{24}\right) 10^{(L_n + 10) + 10} \right]$$

where L_d = The daytime average sound level.

L_n = The nighttime average sound level.

D. "dBA" means abbreviation for the sound level in decibels determined by the A-weighting network of a sound level meter or by calculation from octave band or one-third octave band data.

E. "Daytime hours" means 7 a.m. to 10 p.m., local time.

F. "Decibel (dB)" means a unit of measure equal to ten times the logarithm to the base ten of the ratio of a particular sound pressure squared to a standard reference pressure squared. For the purpose of this subtitle, 20 micropascals shall be the standard reference pressure.

G. "Demolition" means any dismantling, destruction, or removal activities.

H. "Department" means the Department of the Environment.

I. "Emergency" means any occurrence or set of circumstances involving actual or imminent physical trauma or property damage which demands immediate action.

J. "Environmental noise" means the noise that exists at any location from all sources.

K. "Environmental noise standards" means the goals for environmental noise, the attainment and maintenance of which, in defined areas and under specific conditions, are necessary to protect the public health and general welfare.

L. "Equivalent sound level" (also "average sound level") means the level of a constant sound which, in a given situation and time period, would convey the same sound energy as does the actual time-varying sound during the same period. Equivalent sound level is the level of the time weighted, mean-square, A-weighted sound pressure. A numerical subscript may be used to indicate the time period under consideration; i.e., $L_{eq}(24)$ or $L_{eq}(8)$ for 24-hour and 8-hour periods, respectively. No subscript indicates a 24-hour period. The mathematical expression for the L_{eq} is as follows:

$$L^{eq} = 10 \log_{10} \left[\frac{1}{t_2 - t_1} \int_{t_1}^{t_2} 10^{L_A(t)/10} \, dt \right] \text{dBA}$$

where t_1 and t_2 are the beginning and ending times, respectively, of the period over which the average is determined, and $L_A(t)$ is the instantaneous A-weighted sound pressure level fluctuating with time.

M. "Nighttime hours" means 10 p.m. to 7 a.m., local time.

N. "Noise" means the intensity, frequency, duration, and character of sound, including sound and vibration of sub-audible frequencies.

O. "Noise pollution" means the presence of noise of sufficient loudness, character, and duration, which whether from a single source or multiple sources, is, or may be predicted with reasonable certainty to be, injurious to health or which unreasonably interferes with the proper enjoyment of property or with any lawful business or activity.

P. "Periodic noise" means noise possessing a repetitive on-and-off characteristic.

Q. "Person" means any individual, group of individuals, firm, partnership, voluntary association, or private, public, or municipal corporation, or political subdivision of the State, or department, bureau, agency, or instrument of federal, State, or local government, responsible for the use of property.

R. "Prominent discrete tone" means any sound which can be distinctly heard as a single pitch or a set of single pitches. For the purposes of this regulation, a prominent discrete tone shall exist if the one-third octave band sound pressure level in the band with the tone exceeds the arithmetic average of the sound pressure levels of the 2 contiguous one-third octave bands by 5 dB for center frequencies of 500 Hz and above and by 8 dB for center frequencies between 160 and 400 Hz and by 15 dB for center frequencies less than or equal to 125 Hz.

S. "Sound level" means, in decibels, the weighted sound pressure level measured by the use of a sound level meter satisfying the requirements of ANSI S1.4 1971 "Specifications for Sound Level Meters". Sound level and noise level are synonymous. The weighting employed shall always be specified.

T. "Sound level meter" means an instrument, meeting ANSI S1.4 1971 "Specifications for Sound Level Meters", comprising a microphone, an amplifier, an output meter, and frequency-weighting network(s) that is used for the measurement of sound pressure levels in a specified manner.

U. Sound Pressure.

(1) "Sound pressure" means the minute fluctuations in atmospheric pressure which accompany the passage of a sound wave.

(2) For a steady sound, the value of the sound pressure average over a period of time.

(3) Sound pressure is usually measured in dynes per square centimeter (dyne/cm^2), or in newtons per square meter (N/m^2), or in micropascals.

V. "Sound pressure level" means, in decibels, 20 times the logarithm to the base ten of the ratio of a sound pressure to the reference sound pressure of 20 micropascals (20 micronewtons per square meter). In the absence of any modifier, the level is understood to be that of a root-mean-square pressure.

W. "Source" means any person or property, real or personal, contributing to noise pollution.

X. "Vibration" means any oscillatory motion of solid bodies.

Y. "Zoning district" means a general land use category, defined according to local subdivision, the activities and uses for which are generally uniform throughout the subdivision. For the purposes of this regulation, property which is not zoned "residential", "commercial", or "industrial", shall be classified according to use as follows:

(1) "Commercial" means property used for buying and selling goods and services;

(2) "Industrial" means property used for manufacturing and storing goods;

(3) "Residential" means property used for dwellings.

.02 Environmental Noise Standards.

A. Precepts.

(1) It is known that noise above certain levels is harmful to the health of humans. Although precise levels at which all adverse health effects occur have not definitely been ascertained, it is known that one's well-being can be affected by noise through loss of sleep, speech interference, hearing impairment, and a variety of other psychological and physiological factors. The establishment of ambient noise standards, or goals, must provide margins of safety in reaching conclusions based on available data which relate noise exposure to health and welfare effects, with due consideration to technical and economic factors.

(2) The environmental noise standards set forth here represent goals expressed in terms of equivalent A-weighted sound levels which are protective of the public health and welfare. The ambient noise levels shall be achieved through application, under provisions of laws or regulations or otherwise, of means for reducing noise levels including, but not limited to, isolation of noise producing equipment, dampening of sound waves by insulation, equipment modification and redesign, and land use management.

B. Standards for Environmental Noise—General.

(1) The standards are goals for the attainment of an adequate environment. The standards set out in Regulation .03 are intended to achieve these goals.

(2) The following sound levels represent the standards for the State by general zoning district:

Table 1
Environmental Noise Standards

Zoning District	*Level*	*Measure*
Industrial	70 dBA	$L_{eq}(24)$
Commercial	64 dBA	L_{dn}
Residential	55 dBA	L_{dn}

.03 General Regulations.

A. Noise and Vibration Prohibitions.

(1) A person may not cause or permit noise levels which exceed those specified in Table 2 except as provided in §A(2) or (3), or §B, below.

Table 2
Maximum Allowable Noise Levels (dBA)
for Receiving Land Use Categories

Effective Date	*Day/Night*	*Industrial*	*Commercial*	*Residential*
Upon Adoption	Day	75	67	65
	Night	75	62	55

(2) A person may not cause or permit noise levels emanating from construction or demolition site activities which exceed:

(a) 90 dBA during daytime hours;

(b) The levels specified in Table 2 during nighttime hours.

(3) A person may not cause or permit the emission of prominent discrete tones and periodic noises which exceed a level which is 5 dBA lower than the applicable level listed in Table 2.

(4) A person may not cause or permit, beyond the property line of a source, vibration of sufficient intensity to cause another person to be aware of the vibration by such direct means as sensation of touch or visual observation of moving objects. The observer shall be located at or within the property line of the receiving property when vibration determinations are made.

B. Exemptions.

(1) The provisions of this regulation may not apply to devices used solely for the purpose of warning, protecting, or alerting the public, or some segment thereof, of the existence of an emergency situation.

(2) The provisions of this regulation do not apply to the following:

(a) Household tools and portable appliances in normal usage.

(b) Lawn care and snow removal equipment (daytime only) when used and maintained in accordance with the manufacturer's specifications.

(c) Agricultural field machinery when used and maintained in accordance with manufacturer's specifications.

(d) Blasting operations for demolition, construction, and mining or quarrying (daytime only).

(e) Motor vehicles on public roads.

(f) Aircraft and related airport operations at airports licensed by the State Aviation Administration.

(g) Boats on State waters or motor vehicles on State lands under the jurisdiction of the Department of Natural Resources.

(h) Emergency operations.

(i) Pile driving equipment during the daytime hours of 8 a.m. to 5 p.m.

(j) Sound not electronically amplified created by sporting, amusement, and entertainment events and other public gatherings operating according to terms and conditions of the appropriate local jurisdictional body. This includes but is not limited to athletic contests, amusement parks, carnivals, fairgrounds, sanctioned auto racing facili-

ties, parades, and public celebrations. This exemption only applies between the hours of 7 a.m. and 12 midnight.

(k) Rapid rail transit vehicles and railroads.

(l) Construction and repair work on public property.

(m) Air conditioning or heat pump equipment used to cool or heat housing on residential property. For this equipment, a person may not cause or permit noise levels which exceed 70 dBA for air conditioning equipment at receiving residential property and 75 dBA for heat pump equipment at receiving residential property.

C. Variance Procedure.

(1) Any person who believes that meeting the requirements of §A, above, is not practical in a particular case may request an exception to its requirements.

(2) Requests submitted to the Department shall be in writing and shall include evidence to show that compliance is not practical.

(3) Upon receipt of a request for an exception, the Department shall schedule a hearing to be held within 60 days.

(4) The applicant for the exception, at least 30 days before the hearing date, shall advertise prominently the hearing by placing a notice in a newspaper of general circulation in the subdivision in which the facility or source for which the exception is sought is located. The notice shall include the name of the facility or source and such additional information as the Department may require.

(5) Based upon evidence presented at the hearing, the Secretary may grant an exception to §A, above, for a period not to exceed 5 years under terms and conditions appropriate to reduce the impact of the exception.

(6) Exceptions shall be renewable upon receipt by the Department of evidence that conditions under which the exception was originally granted have not changed significantly.

D. Measurement.

(1) The equipment and techniques employed in the measurement of noise levels may be those recommended by the Department, which may, but need not, refer to currently accepted standards or recognized organizations, including, but not limited to, the American National Standards Institute (ANSI), American Society for Testing and Materi-

als (ASTM), Society of Automotive Engineers (SAE), and the United States Environmental Protection Agency (EPA).

(2) The measurement of noise levels shall be conducted at points on or within the property line of the receiving property or the boundary of a zoning district, and may be conducted at any point for the determination of identity in multiple source situations.

(3) Sound level meters used to determine compliance with Regulation .03 shall meet or exceed the specifications of the American National Standards Institute or its successor bodies ANSI S1.4-1971 for Type II sound level meters.

.04 Emission Regulations.

Reserved.

.05 Penalties.

A. Civil Penalty. Any person who willfully violates these regulations shall be liable to a civil penalty of not more than $10,000. Each day during which a violation continues there shall be liability for a separate penalty.

B. Plan for Compliance. A violator who has submitted a plan for compliance with these regulations and has that plan or amendments to it approved by the Secretary, upon recommendation of the Department, may not be considered to be in violation of these regulations as long as he acts in accordance with the original or amended plan.

Administrative History

Effective date: August 6, 1975 (2:17 Md. R. 1189)

Regulation .01A-1, W-1 adopted effective February 15, 1982 (9:3 Md. R. 222); repealed effective March 28, 1983 (10:6 Md. R. 558)

Regulations .01 and .03A, B, D amended effective September 14, 1977 (4:19 Md. R. 1468)

Regulation .01C amended effective March 28, 1983 (10:6 Md. R. 558)

Regulations .01C, Q; .02B; .03B, D amended effective February 15, 1982 (9:3 Md. R. 222)

Regulation .03A amended as an emergency provision effective November 13, 1979 (6:24 Md. R. 1917); emergency status expired March 29, 1980

Regulation .03A and B amended effective March 28, 1983 (10:6 Md. R. 558)

Regulation .04 repealed effective September 14, 1977 (4:19 Md. R. 1468)

Chapter recodified from COMAR 10.20.01 to COMAR 26.02.03

TITLE 3.

NOISE CONTROL.

Subtitle 1. Definitions; General Provisions.

§ 3-101. Definitions.

(a) *In general.* — In this title the following words have the meanings indicated.

(b) *Committee.* — "Committee" means the Interagency Noise Control Committee.

(c) *Council.* — "Council" means the Environmental Noise Advisory Council.

(d) *Environmental noise standard.* — "Environmental noise standard" means a goal for the limitation of noise, from all sources, that exists in a defined area under specified conditions.

(e) *Noise.* — (1) "Noise" means the intensity, frequency, duration, and character of sound.

(2) "Noise" includes sound and vibration of subaudible frequencies.

(f) *Political subdivision.* — "Political subdivision" means a county or municipal corporation of this State.

(g) *Sound level limit.* — "Sound level limit" means the maximum allowable noise emission from a noise source in a defined area under specified conditions.

(h) *Source.* — "Source" means any person or property from which sound originates. (An. Code 1957, art. 43, § 823; 1982, ch. 240, § 2.)

§ 3-102. Legislative findings and intent.

(a) *Findings.* — The General Assembly finds:

(1) That the people of this State have a right to an environment that is free from any noise that:

(i) May jeopardize their health, general welfare, or property; or

(ii) Degrades the quality of their lives;

(2) That there is a substantial body of knowledge about the adverse effects of excessive noise on the public health, the general welfare, and property, and that this knowledge should be used to develop environmental noise standards that will protect the public health, the general welfare, and property with an adequate margin of safety; and

(3) That it is essential to have coordination and statewide leadership of the noise control activities of the many State agencies and the county and local governments.

(b) *Intent.* — It is the intent of the General Assembly that the Department shall:

(1) Seek appropriate resources to ensure enforcement of the sound level limits and noise control rules and regulations adopted under this title; and

(2) Work cooperatively with the appropriate agencies of political subdivisions in ensuring the implementation and enforcement of the requirements of this title. (An. Code 1957, art. 43, § 822; 1982, ch. 240, § 2; 1994, ch. 463.)

Effect of amendments. — The 1994 amendment, effective July 1, 1994, added (b).

§ 3-103. Responsibilities of Department.

(a) *In general.* — Except as otherwise provided by law, and in addition to the duties set forth elsewhere in this title, the Department shall:

(1) Develop a plan for attaining and maintaining the environmental noise standards that are adopted;

(2) Coordinate all State agency programs on noise control; and

(3) Keep a record of each sound level limit that is adopted by any political subdivision or agency of this State.

(b) *Consultation by State agency.* — Each State agency shall consult with the Department before adopting any sound level limit or noise control rule or regulation. (An. Code 1957, art. 43, §§ 824, 826, 832; 1982, ch. 240, § 2.)

Baltimore noise control ordinance violative of federal Constitution. — A Baltimore noise control ordinance, as applied to the amplification of political speech on public streets, so as to prohibit amplification that created no more noise than a person speaking slightly louder than normal, was vague and overbroad in violation of the First and Fourteenth Amendments to the federal Constitution. United States Labor Party v. Pomerleau, 557 F.2d 410 (4th Cir. 1977).

§ 3-104. Authority to obtain funds.

The Department may obtain any federal or other funds that are available to this State for purposes that are within the scope of this title. (An. Code 1957, art. 43, § 831; 1982, ch. 240, § 2.)

§ 3-105. Powers and duties of political subdivisions.

(a) *Power to adopt ordinances, rules, or regulations; limitations on authority.* — (1) Except as provided in this section, this title does not limit the power of a political subdivision to adopt noise control ordinances, rules, or regulations.

(2) A political subdivision may not adopt any noise control ordinance, rule, or regulation that is less stringent than the environmental noise standards, sound level limits, and noise control rules and regulations adopted under this title.

(3) (i) A political subdivision may not adopt any noise control ordinance, rule, or regulation, including the environmental noise standards, sound level limits, and noise control rules and regulations adopted under this title, that prohibits trapshooting, skeetshooting, or other target shooting between the hours of 9 a.m. and 10 p.m. by a shooting sports club that is chartered and in operation as of July 1, 1983. However, this prohibition does not apply if the sports shooting club moves to a parcel of land that is not contiguous to the location of the club on July 1, 1983.

(ii) This paragraph does not apply in Allegany, Anne Arundel, Baltimore City, Calvert, Charles, Garrett, Howard, Montgomery, St. Mary's, and Washington counties.

(b) *Duties.* — Each political subdivision shall:

(1) Send to the Department a copy of each noise control ordinance, rule, or regulation that it adopts; and

(2) Identify on each zoning map, comprehensive plan, or other appropriate document the sound level limits that are adopted under Subtitle 4 of this title. (An. Code 1957, art. 43, §§ 829, 832; 1982, ch. 240, § 2; 1983, ch. 338.)

Baltimore noise control ordinance violative of federal Constitution. — A Baltimore noise control ordinance, as applied to the amplification of political speech on public streets, so as to prohibit amplification that created no more noise than a person speaking slightly louder than normal, was vague and overbroad in violation of the First and Fourteenth Amendments to the federal Constitution. United States Labor Party v. Pomerleau, 557 F.2d 410 (4th Cir. 1977).

Subtitle 2. Environmental Noise Advisory Council.

§ 3-201. Council established.

There is an Environmental Noise Advisory Council in the Department. (An. Code 1957, art. 43, § 825; 1982, ch. 240, § 2.)

§ 3-202. Membership.

(a) *Composition; appointment of members.* — (1) The Council consists of 5 members appointed by the Secretary.

(2) Of the 5 Council members:

(i) 1 shall be appointed from a list of at least 3 qualified individuals submitted to the Secretary by the Acoustical Society of America;

(ii) 1 shall be a physician who specializes in hearing, appointed from a list of at least 3 qualified individuals submitted to the Secretary by the Medical and Chirurgical Faculty of the State of Maryland;

(iii) 1 shall be appointed from a list of at least 3 qualified individuals submitted to the Secretary by the Chancellor of the University of Maryland System; and

(iv) 2 shall be appointed from the general public.

(3) Before appointing the members from among the general public, the Secretary shall request and consider suggestions for nominees from:

(i) The Maryland State Chamber of Commerce;

(ii) The Maryland Transportation Federation;

(iii) The Maryland Environmental Trust; and

(iv) Any other environmental groups that the Secretary selects.

(4) In making any appointment to the Council, the Secretary shall consider giving appropriate representation to the various geographical areas of this State.

(b) *Qualifications.* — Each member of the Council shall be a resident of this State.

(c) *Tenure; vacancies.* — (1) The term of a member is 5 years.

(2) The terms of members are staggered as required by the terms provided for members of the Council on July 1, 1982. The terms of those members end as follows:

(i) 1 in 1983;

(ii) 1 in 1984;

(iii) 1 in 1985;

(iv) 1 in 1986; and

(v) 1 in 1987.

(3) At the end of a term, a member continues to serve until a successor is appointed and qualifies.

(4) A member who is appointed after a term has begun serves only for the rest of the term and until a successor is appointed and qualifies. (An. Code 1957, art. 43, § 825; 1982, ch. 240, § 2; 1988, ch. 246, § 2.)

§ 3-203. Officers.

From among the Council members, the Secretary of the Environment shall appoint a chairman, a vice chairman, and a secretary of the Council. (An. Code 1957, art. 43, § 825; 1982, ch. 240, § 2; 1987, ch. 306, § 16; 1988, ch. 6, § 11.)

§ 3-204. Meetings; compensation; staff.

(a) *Meetings.* — The Council shall meet at the times and places that the Secretary or the chairman determines.

(b) *Compensation and reimbursement for expenses.* — A member of the Council:

(1) May not receive compensation; but

(2) Is entitled to reimbursement for expenses under the Standard State Travel Regulations, as provided in the State budget.

(c) *Staff.* — The Department shall provide the Council with secretarial and stenographic assistance. (An. Code 1957, art. 43, § 825; 1982, ch. 240, § 2.)

§ 3-205. Advisory role of Council.

(a) *Duty of Department.* — Before the Department adopts any environmental noise standard or sound level limit, the Department shall submit the proposed environmental noise standard or sound level limit to the Council for advice.

(b) *Duty of Council.* — Within 60 days after receiving a proposed environmental noise standard or sound level limit from the Department, the Council shall give the Department its advice on the proposal by recommending:

(1) Adoption;

(2) Rejection; or

(3) Modification. (An. Code 1957, art. 43, §§ 825, 828; 1982, ch. 240, § 2.)

University of Baltimore Law Review. — For article, "Preservation of Maryland Farmland: A Current Assessment," see 8 U. Balt. L. Rev. 429 (1979).

Subtitle 3. Interagency Noise Control Committee.

§ 3-301. Committee established.

There is an Interagency Noise Control Committee. (An. Code 1957, art. 43, § 827; 1982, ch. 240, § 2.)

§ 3-302. Composition; chairman.

(a) The Committee consists of:

(1) 1 member of the Governor's executive staff, appointed by the Governor; and

(2) 1 representative of each of the following departments, appointed by the Secretary of that department:

(i) The Department of the Environment;

(ii) The State Department of Transportation;

(iii) The Department of Natural Resources;

(iv) The Office of Planning; and

(v) Any other principal department that develops, adopts, or enforces any noise control rule or regulation.

(b) *Chairman.* — The member who is appointed by the Secretary of the Environment is chairman of the Committee. (An. Code 1957, art. 43, § 827; 1982, ch. 240, § 2; 1987, ch. 306, § 16; 1988, ch. 6, § 11; 1989, ch. 540, § 1.)

§ 3-303. Meetings; compensation; staff.

(a) *Meetings.* — The Committee shall meet at least twice a year, at the times and places that it determines.

(b) *Compensation and reimbursement for expenses.* — A member of the Committee:

(1) May not receive compensation; but

(2) Is entitled to reimbursement for expenses under the Standard State Travel Regulations, as provided in the State budget.

(c) *Staff, consultants, and facilities.* — (1) In accordance with the State budget, the Committee may:

(i) Employ a staff;

(ii) Employ consultants; and

(iii) Obtain office facilities.

(2) The Department of the Environment shall provide the Committee with secretarial and stenographic assistance. (An. Code 1957, art. 43, § 827; 1982, ch. 240, § 2; 1987, ch. 306, § 16; 1988, ch. 6, § 11.)

§ 3-304. Duties of Committee.

(a) *In general.* — The Committee shall:

(1) Receive reports of progress, problems, and proposed plans for attaining and maintaining State environmental noise standards from each agency that is represented on the Committee;

(2) Evaluate the adequacy of existing and proposed efforts to attain and maintain State environmental noise standards;

(3) Review the relationship of State noise control rules and regulations with other environmental laws, rules, regulations, standards, and programs; and

(4) Recommend new or revised noise control rules, regulations, or legislation.

(b) *Annual report.* — If the Council requests, the annual report of the Committee shall include a report of the Council. (An. Code 1957, art. 43, § 827; 1982, ch. 240, § 2; 1991, ch. 55, § 6; 1992, ch. 432; 1993, ch. 4, § 2.)

Subtitle 4. Rulemaking and Enforcement.

§ 3-401. Environmental noise standards, sound level limits, and noise control rules and regulations — Adoption.

(a) *Duty of Department.* — Except as otherwise provided by law, the Department shall adopt environmental noise standards, sound level limits, and noise control rules and regulations as necessary to protect the public health, the general welfare, and property.

(b) *Environmental noise standards.* — In adopting environmental noise standards, the Department shall consider:

(1) Information published by the Administrator of the United States Environmental Protection Agency on the levels of environmental noise that must be attained and maintained in defined areas under various conditions to protect public health and welfare with an adequate margin of safety; and

(2) Scientific information about the volume, frequency, duration, and other characteristics of noise that may harm public health, safety, or general welfare, including:

(i) Temporary or permanent hearing loss;

(ii) Interference with sleep, speech communication, work, or other human activities;

(iii) Adverse physiological responses;

(iv) Psychological distress;

(v) Harm to animal life;

(vi) Devaluation of or damage to property; and

(vii) Unreasonable interference with the enjoyment of life or property.

(c) *Sound level limits; noise control rules and regulations; exceptions.* — (1) In adopting sound level limits and noise control rules and regulations, the Department shall consider, among other things:

(i) The residential, commercial, or industrial nature of the area affected;

(ii) Zoning;

(iii) The nature and source of various kinds of noise;

(iv) The degree of noise reduction that may be attained and maintained using the best available technology;

(v) Accepted scientific and professional methods for measurement of sound levels; and

(vi) The cost of compliance with the sound level limits.

(2) The sound level limits adopted under this subsection shall be consistent with the environmental noise standards adopted by the Department.

(3) The sound level limits and noise control rules and regulations adopted under this subsection may not prohibit trapshooting or other target shooting

on any range or other property in Frederick County that the Frederick County Department of Planning and Zoning has approved as a place for those sporting events.

(4) The sound level limits and noise control rules and regulations adopted under this subsection shall be as follows for residential heat pumps and air conditioning units:

(i) Residential heat pumps 75dba;

(ii) Residential air conditioning units 70dba.

(5) (i) The sound level limits and noise control rules and regulations adopted under this subsection may not prohibit trapshooting, skeetshooting, or other target shooting between the hours of 9 a.m. and 10 p.m. on any range or other property of a shooting sports club that is chartered and in operation as of July 1, 1983. However, this prohibition does not apply if the sports shooting club moves to a parcel of land that is not contiguous to the location of the club on July 1, 1983.

(ii) This paragraph does not apply in Allegany, Anne Arundel, Baltimore City, Calvert, Charles, Garrett, Howard, Montgomery, St. Mary's, and Washington Counties.

(d) *Exceptions.* — (1) This section does not authorize the Department to adopt environmental noise standards, sound level limits, or noise control rules and regulations that apply to noise from:

(i) Construction or repair work on public property; or

(ii) Fire or rescue station alerting devices.

(2) Noise control rules and regulations that apply to Department of Transportation facilities shall be adopted jointly by the Department of Transportation and the Department of the Environment. (An. Code 1957, art. 43, §§ 823, 824, 828, 830; 1982, ch. 240, § 2; ch. 527; 1983, ch. 338; 1987, ch. 306, § 16; 1988, ch. 6, § 11.)

University of Baltimore Law Review. — For article, "Preservation of Maryland Farmland: A Current Assessment," see 8 U. Balt. L. Rev. 429 (1979).

Nuisance actions. — Even if a gun club in Anne Arundel qualified for an exemption under regulations promulgated under subsection (c) because its activities constituted sporting, amusement, and entertainment events, the exemption would not bar persons who reside in a residential district from seeking equitable relief from a nuisance created by the gun club. Anne Arundel County Fish & Game Conservation Ass'n v. Carlucci, 83 Md. App. 121, 573 A.2d 847, cert. denied, 320 Md. 800, 580 A.2d 218 (1990).

Cited in Willow Tree Learning Ctr., Inc. v. Prince George's County, 85 Md. App. 508, 584 A.2d 157 (1991).

§ 3-402. Same — Procedures for adoption.

(a) *Compliance with Administrative Procedure Act.* — The Department may not adopt any environmental noise standard, sound level limit, or noise control rule or regulation unless the requirements of this section and the Administrative Procedure Act are met.

(b) *Public hearing.* — Before adopting any proposed environmental noise standard, sound level limit, or noise control rule or regulation, the Department shall announce and hold a public hearing on the subject.

(c) *Notice.* — (1) At least 60 days before the public hearing, the Department shall publish notice of the hearing in a newspaper of general circulation within the area concerned.

(2) The notice shall state:

(i) The date, time, and place of the hearing; and

(ii) The purpose of the hearing.

(d) *Public inspection.* — At least 60 days before the public hearing, the Department shall make the proposed environmental noise standard, sound level limit, or noise control rule or regulation available to the public.

(e) *Action after hearing.* — After the public hearing, the Department may adopt the proposed environmental noise standard, sound level limit, or noise control rule or regulation, with or without modification. (An. Code 1957, art. 43, § 828; 1982, ch. 240, § 2.)

University of Baltimore Law Review. — For article, "Preservation of Maryland Farmland: A Current Assessment," see 8 U. Balt. L. Rev. 429 (1979).

§ 3-403. Same — Enforcement.

(a) *Duty of Department.* — The Department shall enforce the sound level limits and noise control rules and regulations adopted under this title.

(b) *Use of agency facilities and services.* — To the maximum extent possible, the Department shall use the facilities and services of appropriate agencies of political subdivisions in its enforcement under this section.

(c) *Assistance to political subdivisions.* — The Department may assist the noise control efforts of any appropriate agency of any political subdivision by giving that agency technical assistance in the form of personnel or equipment.

(d) *Application of sound level limits.* — Each sound level limit shall be applied at the boundary of:

(1) A property; or

(2) A land use category, as determined by the Department. (An. Code 1957, art. 43, § 828; 1982, ch. 240, § 2.)

University of Baltimore Law Review. — For article, "Preservation of Maryland Farmland: A Current Assessment," see 8 U. Balt. L. Rev. 429 (1979).

§ 3-404. Corrective orders.

If the Department determines that there is a violation of this title or any sound level limit or noise control rule or regulation adopted under this title, the Department, after notice to the alleged violator, may issue a corrective order. (An. Code 1957, art. 43, §§ 828, 830; 1982, ch. 240, § 2.)

University of Baltimore Law Review. — For article, "Preservation of Maryland Farmland: A Current Assessment," see 8 U. Balt. L. Rev. 429 (1979).

§ 3-405. Injunctive actions.

(a) *In general.* — The Department may bring an action to enjoin any conduct that is a willful violation of any provision of this title or any rule, regulation, or order adopted or issued under this title.

(b) *Prior notice required.* — An action may not be brought under this section unless the person against whom it is brought has been given a reasonable time to comply with the provision that is the basis of the action. (An. Code 1957, art. 43, § 830; 1982, ch. 240, § 2.)

Stated in Anne Arundel County Fish & Game Conservation Ass'n v. Carlucci, 83 Md. App. 121, 573 A.2d 847, cert. denied, 320 Md. 800, 580 A.2d 218 (1990).

§ 3-406. Civil penalty.

(a) *In general.* — A person who willfully violates any provision of this title or any rule, regulation, or order adopted or issued under this title is liable to a civil penalty not exceeding $10,000, to be collected in a civil action brought by the Department in the circuit court for any county. Each day a violation continues is a separate violation under this section.

(b) *Compromise.* — If the Attorney General concurs, the Secretary may compromise and settle any claim for a civil penalty under this section.

(c) *Remission of penalty.* — If, within 1 year after a civil penalty is compromised and settled under subsection (b) of this section, the person against whom the penalty is imposed satisfies the Secretary that the violation has been eliminated or the order has been satisfied, the Secretary, with the concurrence of the Attorney General, may return to the person not more than 75 percent of the penalty paid.

(d) *Action not exclusive.* — An action under this section is in addition to and not instead of an action for injunctive relief under § 3-405 of this subtitle. (An. Code 1957, art. 43, § 830; 1982, ch. 240, § 2.)

Stated in Anne Arundel County Fish & Game Conservation Ass'n v. Carlucci, 83 Md. App. 121, 573 A.2d 847, cert. denied, 320 Md. 800, 580 A.2d 218 (1990).

§ 3-407. Plan for compliance.

(a) *Submission and effect.* — A person is not subject to action for a violation of a provision of this title or any rule or regulation adopted under this title so long as the person acts in accordance with a plan for compliance that:

(1) The person has submitted to the Secretary; and

(2) The Secretary has approved, with or without amendments.

(b) *Duty of Secretary to act.* — The Secretary shall act on any plan for compliance within 90 days after the plan is submitted to the Secretary. (An. Code 1957, art. 43, § 830; 1982, ch. 240, § 2.)

§ 3-408. Conditions not violations.

A condition that is caused by an act of God, a strike, a riot, a catastrophe, or a cause over which an alleged violator has no control is not a violation of this title or any rule or regulation adopted under this title. (An. Code 1957, art. 43, § 830; 1982, ch. 240, § 2.)

Subtitle 1. Definitions; General Provisions.

§ 3-105. Powers and duties of political subdivisions.

(a) *Power to adopt ordinances, rules, or regulations; limitations on authority.* — (1) Except as provided in this section, this title does not limit the power of a political subdivision to adopt noise control ordinances, rules, or regulations.

(2) A political subdivision may not adopt any noise control ordinance, rule, or regulation that is less stringent than the environmental noise standards, sound level limits, and noise control rules and regulations adopted under this title.

(3) (i) A political subdivision may not adopt any noise control ordinance, rule, or regulation, including the environmental noise standards, sound level limits, and noise control rules and regulations adopted under this title, that prohibits trapshooting, skeetshooting, or other target shooting between the hours of 9 a.m. and 10 p.m. by a shooting sports club that is chartered and in operation as of July 1, 1983. However, this prohibition does not apply if the sports shooting club moves to a parcel of land that is not contiguous to the location of the club on July 1, 1983.

(ii) This paragraph does not apply in Allegany, Baltimore City, Calvert, Charles, Garrett, Howard, Montgomery, St. Mary's, and Washington counties.

(b) *Duties.* — Each political subdivision shall:

(1) Send to the Department a copy of each noise control ordinance, rule, or regulation that it adopts; and

(2) Identify on each zoning map, comprehensive plan, or other appropriate document the sound level limits that are adopted under Subtitle 4 of this title. (An. Code 1957, art. 43, §§ 829, 832; 1982, ch. 240, § 2; 1983, ch. 338; 2000, ch. 425.)

Effect of amendments. — Chapter 425, Acts 2000, effective October 1, 2000, deleted "Anne Arundel" following "Allegany" in (a) (3) (ii).

§ 3-202. Membership.

(a) *Composition; appointment of members.* — (1) The Council consists o members appointed by the Secretary.

(2) Of the 5 Council members:

(i) 1 shall be appointed from a list of at least 3 qualified individu submitted to the Secretary by the Acoustical Society of America;

(ii) 1 shall be a physician who specializes in hearing, appointed fron list of at least 3 qualified individuals submitted to the Secretary by the Medi and Chirurgical Faculty of the State of Maryland;

(iii) 1 shall be appointed from a list of at least 3 qualified individu submitted to the Secretary by the Chancellor of the University System Maryland; and

(iv) 2 shall be appointed from the general public.

(3) Before appointing the members from among the general public, t Secretary shall request and consider suggestions for nominees from:

(i) The Maryland State Chamber of Commerce;

(ii) The Maryland Transportation Federation;

(iii) The Maryland Environmental Trust; and

(iv) Any other environmental groups that the Secretary selects.

(4) In making any appointment to the Council, the Secretary sh consider giving appropriate representation to the various geographical areas this State.

(b) *Qualifications.* — Each member of the Council shall be a resident of t State.

(c) *Tenure; vacancies.* — (1) The term of a member is 5 years.

(2) The terms of members are staggered as required by the terms provid for members of the Council on July 1, 1982. The terms of those members e as follows:

(i) 1 in 1983;

(ii) 1 in 1984;

(iii) 1 in 1985;

(iv) 1 in 1986; and

(v) 1 in 1987.

(3) At the end of a term, a member continues to serve until a successor appointed and qualifies.

(4) A member who is appointed after a term has begun serves only for t rest of the term and until a successor is appointed and qualifies. (An. Co 1957, art. 43, § 825; 1982, ch. 240, § 2; 1988, ch. 246, § 2; 1997, ch. 114, § 1

Effect of amendments. — The 1997 amendment, effective July 1, 1997, substituted "University System of Maryland" for "Univer ty of Maryland System" in (a) (2) (iii).

Subtitle 3. Interagency Noise Control Committee.

§ 3-302. Composition; chairman.

(a) The Committee consists of:

(1) 1 member of the Governor's executive staff, appointed by the Governor; and

(2) 1 representative of each of the following departments, appointed by the Secretary of that department:

(i) The Department of the Environment;

(ii) The State Department of Transportation;

(iii) The Department of Natural Resources;

(iv) The Department of Planning; and

(v) Any other principal department that develops, adopts, or enforces any noise control rule or regulation.

(b) *Chairman.* — The member who is appointed by the Secretary of the Environment is chairman of the Committee. (An. Code 1957, art. 43, § 827; 1982, ch. 240, § 2; 1987, ch. 306, § 16; 1988, ch. 6, § 11; 1989, ch. 540, § 1; 2000, ch. 209, § 2.)

Effect of amendments. — Chapter 209, Acts 2000, effective July 1, 2000, substituted "Department of Planning" for "Office of Planning" in (a) (2) (iv).

Subtitle 4. Rulemaking and Enforcement.

§ 3-401. Environmental noise standards, sound level limits, and noise control rules and regulations — Adoption.

(a) *Duty of Department.* — Except as otherwise provided by law, the Department shall adopt environmental noise standards, sound level limits, and noise control rules and regulations as necessary to protect the public health, the general welfare, and property.

(b) *Environmental noise standards.* — In adopting environmental noise standards, the Department shall consider:

(1) Information published by the Administrator of the United States Environmental Protection Agency on the levels of environmental noise that must be attained and maintained in defined areas under various conditions to protect public health and welfare with an adequate margin of safety; and

(2) Scientific information about the volume, frequency, duration, and other characteristics of noise that may harm public health, safety, or general welfare, including:

(i) Temporary or permanent hearing loss;

(ii) Interference with sleep, speech communication, work, or other human activities;

(iii) Adverse physiological responses;

(iv) Psychological distress;

(v) Harm to animal life;

(vi) Devaluation of or damage to property; and

(vii) Unreasonable interference with the enjoyment of life or prop

(c) *Sound level limits; noise control rules and regulations; exception.*

(1) In adopting sound level limits and noise control rules and regulations Department shall consider, among other things:

(i) The residential, commercial, or industrial nature of the are fected;

(ii) Zoning;

(iii) The nature and source of various kinds of noise;

(iv) The degree of noise reduction that may be attained and mainta using the best available technology;

(v) Accepted scientific and professional methods for measureme sound levels; and

(vi) The cost of compliance with the sound level limits.

(2) The sound level limits adopted under this subsection shall be co tent with the environmental noise standards adopted by the Department

(3) The sound level limits and noise control rules and regulations ado under this subsection may not prohibit trapshooting or other target sho on any range or other property in Frederick County that the Frederick Co Department of Planning and Zoning has approved as a place for those spo events.

(4) The sound level limits and noise control rules and regulations ado under this subsection shall be as follows for residential heat pumps an conditioning units:

(i) Residential heat pumps	75
(ii) Residential air conditioning units	70

(5) (i) The sound level limits and noise control rules and regulat adopted under this subsection may not prohibit trapshooting, skeetshootin other target shooting between the hours of 9 a.m. and 10 p.m. on any ran other property of a shooting sports club that is chartered and in operatio of July 1, 1983. However, this prohibition does not apply if the sports sho club moves to a parcel of land that is not contiguous to the location of the on July 1, 1983.

(ii) This paragraph does not apply in Allegany, Anne Arundel, Baltir City, Calvert, Charles, Garrett, Howard, Montgomery, St. Mary's, and W ington counties.

(d) *Exceptions.* — (1) This section does not authorize the Departmen adopt environmental noise standards, sound level limits, or noise control r and regulations that apply to noise from:

(i) Construction or repair work on public property; or

(ii) Fire or rescue station alerting devices.

(2) Noise control rules and regulations that apply to Departmen Transportation facilities shall be adopted jointly by the Department of Tr portation and the Department of the Environment. (An. Code 1957, art. §§ 823, 824, 828, 830; 1982, ch. 240, § 2; ch. 527; 1983, ch. 338; 1987, ch. § 16; 1988, ch. 6, § 11; 1997, ch. 14, § 1; 2000, ch. 425.)

Effect of amendments. — The 1997 amendment, approved Apr. 8, 1997, and effective from date of enactment, substituted a period for a semicolon in (c) (4) (i).

Chapter 425, Acts 2000, effective Oct. 1, 2000, reenacted (a) and (c) (5) without change.

Subtitle 5. Duties and Authority of Units of State Government.

§ 3-501. "Unit" defined.

In this subtitle, "unit" means a unit of the State government. (1997, ch. 31, § 1.)

REVISOR'S NOTE

This section is new language added for brevity to avoid excessive repetition throughout this subtitle of the phrase "unit of State government".

Editor's note. — Section 8, ch. 31, Acts 1997, provides that "except in the repeal of provisions of law believed by the General Assembly to be obsolete, this Act may not be interpreted to render any substantive change to the Laws of Maryland."

Section 11, ch. 31, Acts 1997, provides that the act shall take effect Oct. 1, 1997.

§ 3-502. Support of State noise control policy.

To the fullest extent consistent with its authority under a law that it administers, a unit shall carry out programs that the unit administers to further the policy of the State to provide people with an environment free from noise that:

(1) May jeopardize health, general welfare, and property; or

(2) Degrades the quality of life. (An. Code 1957, art. 41, § 1-401; 1997, ch. 31, § 1.)

REVISOR'S NOTE

This section is new language derived without substantive change from former Art. 41, § 1-401(a).

§ 3-503. Compliance with noise control requirements.

A unit shall comply with federal, State, and interstate requirements concerning the control of environmental noise if the unit:

(1) Has jurisdiction over any property or facility; or

(2) Engages in any activity that results, or may result, in the emission of noise. (An. Code 1957, art. 41, § 1-401; 1997, ch. 31, § 1.)

REVISOR'S NOTE

This section is new language derived without substantive change from former Art. 41, § 1-401(b).

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§ 3-504. Sound level limits or regulations.

A unit that prescribes sound level limits or regulations concerning n periodically shall:

(1) Take into account the degree of noise reduction achievable through application of the best available technology and the cost of compliance; ar

(2) Consult with the Department in prescribing the limits or regulatic (An. Code 1957, art. 41, § 1-401; 1997, ch. 31, § 1.)

REVISOR'S NOTE

This section is new language derived without substantive change from former Art. 41, § 1-401(c).

§ 3-505. Investigation of complaints.

A unit that enforces a regulation concerning noise may:

(1) Investigate a complaint concerning noise;

(2) Institute and conduct a survey and testing program concerning noi

(3) Test or make another determination of the source of a noise; and

(4) Assess the degree of required abatement of the noise. (An. Code 19 art. 41, § 1-401; 1997, ch. 31, § 1.)

REVISOR'S NOTE

This section is new language derived without substantive change from former Art. 41, § 1-401(d).

In paragraphs (1) and (2) of this section, the reference to "concerning noise" is added for clarity to avoid any implication that the aut ity of a unit under these paragraphs applie situations not involving noise.

§ 3-506. Representatives on Interagency Noise Contr Committee.

A unit that prescribes or enforces a regulation concerning noise sh designate a representative to serve on the Interagency Noise Control Comn tee. (An. Code 1957, art. 41, § 1-401; 1997, ch. 31, § 1.)

REVISOR'S NOTE

This section is new language derived without substantive change from former Art. 41, § 1-401(e).

Cross references. — See Editor's note to § 3-501 of this article.

Title 26
DEPARTMENT OF THE ENVIRONMENT

Subtitle 02 OCCUPATIONAL, INDUSTRIAL, AND RESIDENTIAL HAZARDS

Chapter 03 Control of Noise Pollution

Authority: Environment Article, §3-401,
Annotated Code of Maryland

Preface

The Environmental Noise Act of 1974 of the State of Maryland declares as policy the limitation of noise to that level which will protect the health, general welfare, and property of the people of the State. It requires that the Department assume responsibility for the jurisdiction over the level of noise, and prepare regulations for the control of noise, including the establishment of standards for ambient noise levels and equipment performance with respect to noise, for adoption by the Secretary of the Environment. Enforcement of the regulations and standards is the responsibility of the Department in all areas, using the facilities and services of local agencies within the areas to the greatest extent possible. The Department shall coordinate the programs of all State agencies relating to noise abatement, and each State agency prescribing sound level limits or regulations respecting noise shall obtain the endorsement of the Department in prescribing any limits or regulations.

.01 Definitions.

A. "ANSI" means American National Standards Institute or its successor bodies.

B. "Construction" means any site preparation, assembly, erection, repair, alteration, or similar activity.

C. "Day-night average sound level (L_{dn})" means in decibels, the energy average sound level for a 24-hour day with a 10 decibel penalty applied to noise occurring during the nighttime period; i.e., noise levels occurring during the period from 10 p.m. one day until 7 a.m. the next are treated as though they were 10 dBA higher than they actually are. The use of the A-weighting is understood. The mathematical expression for L_{dn} is as follows:

$$L_{dn} = 10\log_{10}\left[\left(\frac{15}{24}\right)10^{L_d+10} + \left(\frac{9}{24}\right)10^{(L_n+10)+10}\right]$$

where L_d = The daytime average sound level.

L_n = The nighttime average sound level.

D. "dBA" means abbreviation for the sound level in decibels determined by the A-weighting network of a sound level meter or by calculation from octave band or one-third octave band data.

E. "Daytime hours" means 7 a.m. to 10 p.m., local time.

F. "Decibel (dB)" means a unit of measure equal to ten times the logarithm to the base ten of the ratio of a particular sound pressure squared to a standard reference pressure squared. For the purpose of this subtitle, 20 micropascals shall be the standard reference pressure.

G. "Demolition" means any dismantling, destruction, or removal activities.

H. "Department" means the Department of the Environment.

I. "Emergency" means any occurrence or set of circumstances involving actual or imminent physical trauma or property damage which demands immediate action.

J. "Environmental noise" means the noise that exists at any location from all sources.

K. "Environmental noise standards" means the goals for environmental noise, the attainment and maintenance of which, in defined areas and under specific conditions, are necessary to protect the public health and general welfare.

L. "Equivalent sound level" (also "average sound level") means the level of a constant sound which, in a given situation and time period, would convey the same sound energy as does the actual time-varying sound during the same period. Equivalent sound level is the level of the time weighted, mean square, A-weighted sound pressure. A numerical subscript may be used to indicate the time period under consideration; i.e., Leq(24) or Leq(8) for 24-hour and 8-hour periods, respectively. No subscript indicates a 24-hour period. The mathematical expression for the *Leq* is as follows:

$$L^{eq} = 10\log_{10}\left[\frac{1}{t_2 - t_1}\int_{t_1}^{t_2} 10^{L_A(t)/10}\,dt\right] dBA$$

where t_1 and t_2 are the beginning and ending times, respectively, of the period over which the average is determined, and $L_A(t)$ is the instantaneous A-weighted sound pressure level fluctuating with time.

M."Nighttime hours" means 10 p.m. to 7 a.m., local time.

N. "Noise" means the intensity, frequency, duration, and character of sound, including sound and vibration of sub-audible frequencies.

0. "Noise pollution" means the presence of noise of sufficient loudness, character, and duration, which whether from a single source or multiple sources, is, or may be predicted with reasonable certainty to be, injurious to health or which unreasonably interferes with the proper enjoyment of property or with any lawful business or activity.

P. "Periodic noise" means noise possessing a repetitive on-and-off characteristic.

Q. "Person" means any individual, group of individuals, firm, partnership, voluntary association, or private, public, or municipal corporation, or political subdivision of the State, or department, bureau, agency, or instrument of federal, State, or local government, responsible for the use of property.

R. "Prominent discrete tone" means any sound which can be distinctly heard as a single pitch or a set of single pitches. For the purposes of this regulation, a prominent discrete tone shall exist if the one-third octave band sound pressure level in the band with the tone exceeds the arithmetic average of the sound pressure levels of the 2 contiguous one-third octave bands by 5 dB for center frequencies of 500 Hz and above and by 8 dB for center frequencies between 160 and 400 Hz and by 15 dB for center frequencies less than or equal to 125 Hz.

S. "Sound level" means, in decibels, the weighted sound pressure level measured by the use of a sound level meter satisfying the requirements of ANSI S1.4 1971 "Specifications for Sound Level Meters". Sound level and noise level are synonymous. The weighting employed shall always be specified.

T. "Sound level meter" means an instrument, meeting ANSI S1.4 1971 "Specifications for Sound Level Meters", comprising a microphone, an amplifier, an output meter, and frequency-weighting network(s) that is used for the measurement of sound pressure levels in a specified manner.

where t_1 and t_2 are the beginning and ending times, respectively, of the period over which the average is determined, and $L_A(t)$ is the instantaneous A-weighted sound pressure level fluctuating with time.

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T. "Sound level meter" means an instrument, meeting ANSI S1.4 1971 "Specifications for Sound Level Meters", comprising a microphone, an amplifier, an output meter, and frequency-weighting network(s) that is used for the measurement of sound pressure levels in a specified manner.

U. Sound Pressure.

(1) "Sound pressure" means the minute fluctuations in atmospheric pressure which accompany the passage of a sound wave.

(2) For a steady sound, the value of the sound pressure average over a period of time.

(3) Sound pressure is usually measured in dynes per square centimeter ($dyne/cm^2$), or in newtons per square meter (N/m^2), or in micropascals.

V. "Sound pressure level" means, in decibels, 20 times the logarithm to the base ten of the ratio of a sound pressure to the reference sound pressure of 20 micropascals (20 micronewtons per square meter). In the absence of any modifier, the level is understood to be that of a root-mean-square pressure.

W. "Source" means any person or property, real or personal, contributing to noise pollution.

X. "Vibration" means any oscillatory motion of solid bodies.

Y. "Zoning district" means a general land use category, defined according to local subdivision, the activities and uses for which are generally uniform throughout the subdivision. For the purposes of this regulation, property which is not zoned "residential", "commercial", or "industrial", shall be classified according to use as follows:

(1) "Commercial" means property used for buying and selling goods and services;

(2) "Industrial" means property used for manufacturing and storing goods;

(3) "Residential" means property used for dwellings.

.02 Environmental Noise Standards.

A. Precepts.

(1) It is known that noise above certain levels is harmful to the health of humans. Although precise levels at which all adverse health effects occur have not definitely been ascertained, it is known that one's well-being can be affected by noise through loss of sleep, speech interference, hearing impairment, and a variety of other psychological and physiological factors. The establishment of ambient noise standards, or goals, must provide margins of safety in reaching conclusions based on available data which relate noise exposure to health and welfare effects, with due consideration to technical and economic factors.

(2) The environmental noise standards set forth here represent goals expressed in terms of equivalent A-weighted sound levels, which are protective of the public health and welfare. The ambient noise levels shall be achieved through application, under provisions of laws or regulations or otherwise, of means for reducing noise levels including, but not limited to, isolation of noise producing equipment, dampening of sound waves by insulation, equipment modification and redesign, and land use management.

B. Standards for Environmental Noise-General.

(1) The standards are goals for the attainment of an adequate environment. The standards set out in Regulation .03 are intended to achieve these goals.

(2) The following sound levels represent the standards for the State by general zoning district:

Table 1
Environmental Noise Standards

Zoning District	*Level*	*Measure*
Industrial	70 dBA	$L_{eq}(24)$
Commercial	64 dBA	L_{dn}
Residential	55 dBA	L_{dn}

.03 General Regulations.

A. Noise and Vibration Prohibitions.

(1) A person may not cause or permit noise levels which exceed those specified in Table 2 except as provided in §A (2) or (3), or §B, below.

Table 2
Maximum Allowable Noise Levels (dBA)
for Receiving Land Use Categories

Effective Date	*Day/Night*	*Industrial*	*Commercial*	*Residential*
	Day	75	67	65
Upon Adoption	Night	75	62	55

(2) A person may not cause or permit noise levels emanating from construction or demolition site activities which exceed:

(a) 90 dBA during daytime hours;

(b) The levels specified in Table 2 during nighttime hours.

(3) A person may not cause or permit the emission of prominent discrete tones and periodic noises which exceed a level which is 5 dBA lower than the applicable level listed in Table 2.

(4) A person may not cause or permit, beyond the property line of a source, vibration of sufficient intensity to cause another person to be aware of the vibration by such direct means as sensation of touch or visual observation of moving objects. The observer shall be located at or within the property line of the receiving property when vibration determinations are made.

B. Exemptions.

(1) The provisions of this regulation may not apply to devices used solely for the purpose of warning, protecting, or alerting the public, or some segment thereof, of the existence of an emergency situation.

(2) The provisions of this regulation do not apply to the following:

(a) Household tools and portable appliances in normal usage.

(b) Lawn care and snow removal equipment (daytime only) when used and maintained in accordance with the manufacturer's specifications.

(c) Agricultural field machinery when used and maintained in accordance with manufacturer's specifications.

(d) Blasting operations for demolition, construction, and mining or quarrying (daytime only).

(e) Motor vehicles on public roads.

(f) Aircraft and related airport operations at airports licensed by the State Aviation Administration.

(g) Boats on State waters or motor vehicles on State lands under the jurisdiction of the Department of Natural Resources.

(h) Emergency operations.

(I) Pile driving equipment during the daytime hours of 8 a.m. to 5 p.m.

(]) Sound not electronically amplified created by sporting, amusement, and entertainment events and other public gatherings operating according to terms and conditions of the appropriate local jurisdictional body. This includes but is not limited to athletic contests, amusement parks, carnivals, fairgrounds, sanctioned auto racing facilities, parades, and public

celebrations. This exemption only applies between the hours of 7 a.m. and 12 midnight.

(k) Rapid rail transit vehicles and railroads.

(l) Construction and repair work on public property.

(m) Air conditioning or heat pump equipment used to cool or heat housing on residential property. For this equipment, a person may not cause or permit noise levels which exceed 70 dBA for air conditioning equipment at receiving residential property and 75 dBA for heat pump equipment at receiving residential property.

C. Variance Procedure.

(1) Any person who believes that meeting the requirements of §A, above, is not practical in a particular case may request an exception to its requirements.

(2) Requests submitted to the Department shall be in writing and shall include evidence to show that compliance is not practical.

(3) Upon receipt of a request for an exception, the Department shall schedule a hearing to be held within 60 days.

(4) The applicant for the exception, at least 30 days before the hearing date, shall advertise prominently the hearing by placing a notice in a newspaper of general circulation in the subdivision in which the facility or source for which the exception is sought is located. The notice shall include the name of the facility or source and such additional information as the Department may require.

(5) Based upon evidence presented at the hearing, the Secretary may grant an exception to §A, above, for a period not to exceed 5 years under terms and conditions appropriate to reduce the impact of the exception.

(6) Exceptions shall be renewable upon receipt by the Department of evidence that conditions under which the exception was originally granted have not changed significantly.

D. Measurement.

(1) The equipment and techniques employed in the measurement of noise levels may be those recommended by the Department, which may, but need not, refer to currently accepted standards or recognized organizations, including, but not limited to, the American National Standards Institute (ANSI), American Society for Testing and Materials

(ASTM), Society of Automotive Engineers (SAE), and the United States Environmental Protection Agency (EPA).

(2) The measurement of noise levels shall be conducted at points on or within the property line of the receiving property or the boundary of a zoning district, and may be conducted at any point for the determination of identity in multiple source situations.

(3) Sound level meters used to determine compliance with Regulation .03 shall meet or exceed the specifications of the American National Standards Institute or its successor bodies ANSI S1.4-1971 for Type II sound level meters.

.04 Emission Regulations.

Reserved.

.05 Penalties.

A. Civil Penalty. Any person who willfully violates these regulations shall be liable to a civil penalty of not more than $10,000. Each day during which a violation continues there shall be liability for a separate penalty.

B. Plan for Compliance. A violator who has submitted a plan for compliance with these regulations and has that plan or amendments to it approved by the Secretary, upon recommendation of the Department, may not be considered to be in violation of these regulations as long as he acts in accordance with the original or amended plan.

Administrative History

Effective date: August 6, 1975 (2:17 Md. R. 1189)

Regulation .01A-1, W-1 adopted effective February 15, 1982 (9:3 Md. R. 222); repealed effective March 28, 1983 (10:6 Md. R. 558)

Regulations .01 and .03A, B, D amended effective September 14, 1977 (4:19 Md. R. 1468)

Regulation .O1C amended effective March 28, 1983 (10:6 Md. R. 558)

Regulations .O1C, Q; .02B; .03B, D amended effective February 15, 1982 (9:3 Md. R. 222)

Regulation .03A amended as an emergency provision effective November 13, 1979 (6:24 Md. R. 1917); emergency status expired March 29, 1980

Regulation .03A and B amended effective March 28, 1983 (10:6 Md. R. 558)

Regulation .04 repealed effective September 14, 1977 (4:19 Md. R. 1468)

Chapter recodified from COMAR 10.20.01 to COMAR 26.02.03

United States
Environmental Protection
Agency

Washington, D.C. 20460
December 1978

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xxxEPA

THE NOISE CONTROL ACT OF 1972

as amended by

THE QUIET COMMUNITIES ACT OF 1978

The Noise Control Act of 1972, Public Law 92-574
(H.R. 11021, 92nd Congress), October 27, 1972

The Quiet Communities Act of 1978, Public Law 95-609
(S. 3083, 95th Congress), November 8, 1978

which contains amendments to the
Noise Control Act of 1972 and a requirement
for an airport noise study.

These amendments are shown in italics.

An Act

To control the emission of noise detrimental to the human environment, and for other purposes.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,

SHORT TITLE

Section 1. This Act may be cited as the "Noise Control Act of 1972," *as amended by the "Quiet Communities Act of 1978."*

FINDINGS AND POLICY

Sec. 2. (a) The Congress finds–

(1) that inadequately controlled noise presents a growing danger to the health and welfare of the Nation's population, particularly in urban areas;

(2) that the major sources of noise include transportation vehicles and equipment, machinery, appliances, and other products in commerce; and

(3) that, while primary responsibility for control of noise rests with State and local governments, Federal action is essential to deal with major noise sources in commerce, control of which requires national uniformity of treatment.

(b) The Congress declares that it is the policy of the United States to promote an environment for all Americans free from noise that jeopardizes their health or welfare. To that end, it is the purpose of this Act to establish a means for effective coordination of Federal research and activities in noise control, to authorize the establishment of Federal noise emission standards for products distributed in commerce, and to provide information to the public respecting the noise emission and noise reduction characteristics of such products.

DEFINITIONS

Sec. 3. For purposes of this Act:

(1) The term "Administrator" means the Administrator of the Environmental Protection Agency.

(2) The term "person" means an individual, corporation, partnership, or association, and (except as provided in sections 11(e) and 12(a)) includes any officer, employee, department, agency, or instrumentality of the United States, a State, or any political subdivision of a State.

(3) The term "product" means any manufactured article or goods or component thereof; except that such term does not include–

(A) any aircraft, aircraft engine, propeller, or appliance, as such terms are defined in section 101 of the Federal Aviation Act of 1958; or

(B) (i) any military weapons or equipment which are designed for combat use; (ii) any rockets or equipment which are designed for research, experimental, or developmental work to be performed by the National Aeronautics and Space Administration; or (iii) to the extent provided by regulations of the Administrator, any other machinery or equipment designed for use in experimental work done by or for the Federal Government.

(4) The term "ultimate purchaser" means the first person who in good faith purchases a product for purposes other than resale.

(c) (1) The Administrator shall coordinate the programs of all Federal agencies relating to noise research and noise control. Each Federal agency shall, upon request, furnish to the Administrator such information as he may reasonably require to determine the nature, scope, and results of the noise-research and noise-control programs of the agency.

(2) Each Federal agency shall consult with the Administrator in prescribing standards or regulations respecting noise. If at any time the Administrator has reason to believe that a standard or regulation, or any proposed standard or regulation, of any Federal agency respecting noise does not protect the public health and welfare to the extent he believes to be required and feasible, he may request such agency to review and report to him on the advisability of revising such standard or regulation to provide such protection. Any such request may be published in the Federal Register and shall be accompanied by a detailed statement of the information on which it is based. Such agency shall complete the requested review and report to the Administrator within such time as the Administrator specifies in the request, but such time specified may not be less than ninety days from the date the request was made. The report shall be published in the Federal Register and shall be accompanied by a detailed statement of the findings and conclusions of the agency respecting the revision of its standard or regulation. With respect to the Federal Aviation Administration, section 611 of the Federal Aviation Act of 1958 (as amended by section 7 of this Act) shall apply in lieu of this paragraph.

(3) On the basis of regular consultation with appropriate Federal agencies, the Administrator shall compile and publish, from time to time, a report on the status and progress of Federal activities relating to noise research and noise control. This report shall describe the noise-control programs of each Federal agency and assess the contributions of those programs to the Federal Government's overall efforts to control noise.

IDENTIFICATION OF MAJOR NOISE SOURCES; NOISE CRITERIA AND CONTROL TECHNOLOGY

Sec. 5. (a) (1) The Administrator shall, after consultation with appropriate Federal agencies and within nine months of the date of the enactment of this Act, develop and publish criteria with respect to noise. Such criteria shall reflect the scientific knowledge most useful in indicating the kind and extent of all identifiable effects on the public health or welfare which may be expected from differing quantities and qualities of noise.

(2) The Administrator shall, after consultation with appropriate Federal agencies and within twelve months of the date of the enactment of this Act, publish information on the levels of environmental noise, the attainment and maintenance of which in defined areas under various conditions are requisite to protect the public health and welfare with an adequate margin of safety.

(b) The Administrator shall, after consultation with appropriate Federal agencies, compile and publish a report or series of reports (1) identifying products (or classes of products) which in his judgment are major sources of noise, and (2) giving information on techniques for control of noise from such products, including available data on the technology, costs, and alternative methods of noise control. The first such report shall be published not later than eighteen months after the date of enactment of this Act.

(c) The Administrator shall from time to time review and, as appropriate, revise or supplement any criteria or reports published under this section.

(d) Any report (or revision thereof) under subsection (b) (1) identifying major noise sources shall be published in the Federal Register. The publication or revision under this section of any criteria or information on control techniques shall be announced in the Federal Register, and copies shall be made available to the general public.

Administrator shall give appropriate consideration to standards under other laws designed to safeguard the health and welfare of persons, including any standards under the National Traffic and Motor Vehicle Safety Act of 1966, the Clean Air Act, and the Federal Water Pollution Control Act. Any such noise emission standards shall be a performance standard. In addition, any regulation under subsection (a) or (b) (and any revision thereof) may contain testing procedures necessary to assure compliance with the emission standard in such regulation, and may contain provisions respecting instructions of the manufacturer for the maintenance, use, or repair of the product.

(2) After publication of any proposed regulations under this section, the Administrator shall allow interested persons an opportunity to participate in rulemaking in accordance with the first sentence of section 553 (c) of title 5, United States Code.

(3) The Administrator may revise any regulation prescribed by him under this section by (A) publication of proposed revised regulations, and (B) the promulgation, not earlier than six months after the date of such publication, of regulations making the revision; except that a revision which makes only technical or clerical corrections in a regulation under this section may be promulgated earlier than six months after such date if the Administrator finds that such earlier promulgation is in the public interest.

(d) (1) On and after the effective date of any regulation prescribed under subsection (a) or (b) of this section, the manufacturer of each new product to which such regulation applies shall warrant to the ultimate purchaser and each subsequent purchaser that such product is designed, built, and equipped so as to conform at the time of sale with such regulation.

(2) Any cost obligation of any dealer incurred as a result of any requirement imposed by paragraph (1) of this subsection shall be borne by the manufacturer. The transfer of any such cost obligation from a manufacturer to any dealer through franchise or other agreement is prohibited.

(3) If a manufacturer includes in any advertisement a statement respecting the cost or value of noise emission control devices or systems, such manufacturer shall set forth in such statement the cost or value attributed to such devices or systems by the Secretary of Labor (through the Bureau of Labor Statistics). The Secretary of Labor, and his representatives, shall have the same access for this purpose to the books, documents, papers, and records of a manufacturer as the Comptroller General has to those of a recipient of assistance for purposes of section 311 of the Clean Air Act.

(e) (1) No State or political subdivision thereof may adopt or enforce—

(A) with respect to any new product for which a regulation has been prescribed by the Administrator under this section, any law or regulation which sets a limit on noise emissions from such new product and which is not identical to such regulation of the Administrator; or

(B) with respect to any component incorporated into such new product by the manufacturer of such product, any law or regulation setting a limit on noise emissions from such component when so incorporated.

(2) Subject to sections 17 and 18, nothing in this section precludes or denies the right of any State or political subdivision thereof to establish and enforce controls on environmental noise (or one or more sources thereof) through the licensing, regulation, or restriction of the use, operation, or movement of any product or combination of products.

(f) *At any time after the promulgation of regulations respecting a product under this section, a State or political subdivision thereof may petition the Administrator to revise such standard on the grounds that a more stringent standard under subsection (c) of this section is necessary to protect the public health and welfare. The Administration shall publish notice of receipt of such petition in the Federal Register and shall within ninety days of receipt of such*

public health and welfare. The FAA shall consider such proposed regulations submitted by EPA under this paragraph and shall, within thirty days of the date of its submission to the FAA, publish the proposed regulations in a notice of proposed rulemaking. Within sixty days after such publication, the FAA shall commence a hearing at which interested persons shall be afforded an opportunity for oral (as well as written) presentations of data, views, and arguments. Within *ninety days* after the conclusion of such hearing and after consultation with EPA, the FAA shall—

"(A) in accordance with subsection (b), prescribe regulations (i) substantially as they were submitted by EPA, or (ii) which are a modification of the proposed regulations submitted by EPA, or

"(B) publish in the Federal Register a notice that it is not prescribing any regulation in response to EPA's submission of proposed regulations, together with a detailed explanation providing reasons for the decision not to prescribe such regulations *and a detailed analysis of and response to all documentation or other information submitted by the Environmental Protection Agency with such proposed regulations.*

"(2) If EPA has reason to believe that the FAA's action with respect to a regulation proposed by EPA under paragraph (1) (A) (ii) or (1) (B) of this subsection does not protect the public health and welfare from aircraft noise or sonic boom, consistent with the considerations listed in subsection (d) of this section, EPA shall consult with the FAA and may request the FAA to review, and report to EPA on, the advisability of prescribing the regulation originally proposed by EPA. Any such request shall be published in the Federal Register and shall include a detailed statement of the information on which it is based. The FAA shall complete the review requested and shall report to EPA within such time as EPA specifies in the request, but such time specified may not be less than ninety days from the date the request was made. The FAA's report shall be accompanied by a detailed statement of the FAA's findings and the reasons for the FAA's conclusions; shall identify any statement filed pursuant to section 102 (2) (C) of the National Environmental Policy Act of 1969 with respect to such action of the FAA under paragraph (1) of this subsection; and shall specify whether (and where) such statements are available for public inspection. The FAA's report shall be published in the Federal Register, except in a case in which EPA's request proposed specific action to be taken by the FAA, and the FAA's report indicates such action will be taken.

"(3) If, in the case of a matter described in paragraph (2) of this subsection with respect to which no statement is required to be filed under such section 102 (2) (C), the report of the FAA indicates that the proposed regulation originally submitted by EPA should not be made, then EPA may request the FAA to file a supplemental report, which shall be published in the Federal Register within such a period as EPA may specify (but such time specified shall not be less than ninety days from the date the request was made), and which shall contain a comparison of (A) the environmental effects (including those which cannot be avoided) of the action actually taken by the FAA in response to EPA's proposed regulations, and (B) EPA's proposed regulations.

"(d) In prescribing and amending standards and regulations under this section, the FAA shall—

"(1) consider relevant available data relating to aircraft noise and sonic boom, including the results of research, development, testing, and evaluation activities conducted pursuant to this Act and the Department of Transportation Act;

"(2) consult with such Federal, State, and interstate agencies as he deems appropriate;

PROHIBITED ACTS

Sec. 10. (a) Except as otherwise provided in subsection (b), the following acts or the causing thereof are prohibited:

(1) In the case of a manufacturer, to distribute in commerce any new product manufactured after the effective date of a regulation prescribed under section 6 which is applicable to such product, except in conformity with such regulation.

(2) (A) The removal or rendering inoperative by any person, other than for purposes of maintenance, repair, or replacement, of any device or element of design incorporated into any product in compliance with regulations under section 6, prior to its sale or delivery to the ultimate purchaser or while it is in use, or (B) the use of a product after such device or element of design has been removed or rendered inoperative by any person.

(3) In the case of a manufacturer, to distribute in commerce any new product manufactured after the effective date of a regulation prescribed under section 8 (b) (requiring information respecting noise) which is applicable to such product, except in conformity with such regulation.

(4) The removal by any person of any notice affixed to a product or container pursuant to regulations prescribed under section 8 (b), prior to sale of the product to the ultimate purchaser.

(5) The importation into the United States by any person of any new product in violation of a regulation prescribed under section 9 which is applicable to such product.

(6) The failure or refusal by any person to comply with any requirement of section 11 (d) or 13 (a) or regulations prescribed under section 13 (a), 17, or 18.

(b) (1) For the purpose of research, investigations, studies, demonstrations, or training, or for reasons of national security, the Administrator may exempt for a specified period of time any product, or class thereof, from paragraphs (1), (2), (3), and (5) of subsection (a), upon such terms and conditions as he may find necessary to protect the public health or welfare.

(2) Paragraphs (1), (2), (3), and (4) of subsection (a) shall not apply with respect to any product which is manufactured solely for use outside any State and which (and the container of which) is labeled or otherwise marked to show that it is manufactured solely for use outside any State; except that such paragraphs shall apply to such product if it is in fact distributed in commerce for use in any State.

ENFORCEMENT

Sec. 11. (a) (1) Any person who willfully or knowingly violates paragraph (1), (3), (5), or (6) of subsection (a) of section 10 of this Act shall be punished by a fine of not more than $25,000 per day of violation, or by imprisonment for not more than one year, or by both. If the conviction is for a violation committed after a first conviction of such person under this subsection, punishment shall be by a fine of not more than $50,000 per day of violation, or by imprisonment for not more than two years, or by both.

(2) *Any person who violates paragraph (1), (3), (5), or (6) of subsection (a) of section 10 of this Act shall be subject to a civil penalty not to exceed $10,000 per day of such violation.*

(b) For the purpose of this section, each day of violation of any paragraph of section 10 (a) shall constitute a separate violation of that section.

(c) The district courts of the United States shall have jurisdiction of actions brought by and in the name of the United States to restrain any violations of section 10 (a) of this Act.

(e) Nothing in this section shall restrict any right which any person (or class of persons) may have under any statute or common law to seek enforcement of any noise control requirement or to seek any other relief (including relief against an Administrator).

(f) For purposes of this section, the term "noise control requirement" means paragraph (1), (2), (3), (4), or (5) of section 10 (a), or a standard, rule, or regulation issued under section 17 or 18 of this Act or under section 611 of the Federal Aviation Act of 1958.

RECORDS, REPORTS, AND INFORMATION

Sec. 13. (a) Each manufacturer of a product to which regulations under section 6 or section 8 apply shall–

(1) establish and maintain such records, make such reports, provide such information, and make such tests, as the Administrator may reasonably require to enable him to determine whether such manufacturer has acted or is acting in compliance with this Act.

(2) upon request of an officer or employee duly designated by the Administrator, permit such officer or employee at reasonable times to have access to such information and the results of such tests and to copy such records, and

(3) to the extent required by regulations of the Administrator, make products coming off the assembly line or otherwise in the hands of the manufacturer available for testing by the Administrator.

(b) (1) All information obtained by the Administrator or his representatives pursuant to subsection (a) of this section, which information contains or relates to a trade secret or other matter referred to in section 1905 of title 18 of the United States Code, shall be considered confidential for the purpose of that section, except that such information may be disclosed to other Federal officers or employees, in whose possession it shall remain confidential, or when relevant to the matter in controversy in any proceeding under this Act.

(2) Nothing in this subsection shall authorize the withholding of information by the Administrator, or by any officers or employees under his control, from the duly authorized committees of the Congress.

(c) Any person who knowingly makes any false statement, representation, or certification in any application, record, report, plan, or other document filed or required to be maintained under this Act or who falsifies, tampers with, or knowingly renders inaccurate any monitoring device or method required to be maintained under this Act, shall upon conviction be punished by a fine of not more than $10,000, or by imprisonment for not more than six months, or by both.

QUIET COMMUNITIES, RESEARCH, PUBLIC INFORMATION

Sec. 14. *To promote the development of effective State and local noise control programs, to provide an adequate Federal noise control research program designed to meet the objectives of this Act, and to otherwise carry out the policy of this Act, the Administrator shall, in cooperation with other Federal agencies and through the use of grants, contracts, and direct Federal actions–*

(a) *develop and disseminate information and educational materials to all segments of the public on the public health and other effects of noise and the most effective means for noise control, through the use of materials for school curricula, volunteer organizations, radio and television programs, publication, and other means;*

(e) *establish regional technical assistance centers which use the capabilities of university and private organizations to assist State and local noise control programs;*

(f) *provide technical assistance to State and local governments to facilitate their development and enforcement of noise control, including direct onsite assistance of agency or other personnel with technical expertise, and preparation of model State or local legislation for noise control; and*

(g) *provide for the maximum use in programs assisted under this section of senior citizens and persons eligible for participation in programs under the Older Americans Act.*

DEVELOPMENT OF LOW-NOISE-EMISSION PRODUCTS

Sec. 15. (a) For the purpose of this section:

(1) The term "Committee" means the Low-Noise-Emission Product Advisory Committee.

(2) The term "Federal Government" includes the legislative, executive, and judicial branches of the Government of the United States, and the government of the District of Columbia.

(3) The term "low-noise-emission product" means any product which emits noise in amounts significantly below the levels specified in noise emission standards under regulations applicable under section 6 at the time of procurement to that type of product.

(4) The term "retail price" means (A) the maximum statutory price applicable to any type of product; or (B) in any case where there is no applicable maximum statutory price, the most recent procurement price paid for any type of product.

(b) (1) The Administrator shall determine which products qualify as low-noise-emission products in accordance with the provisions of this section.

(2) The Administrator shall certify any product—

(A) for which a certification application has been filed in accordance with paragraph (5) (A) of this subsection;

(B) which is a low-noise-emission product as determined by the Administrator; and

(C) which he determines is suitable for use as a substitute for a type of product at that time in use by agencies of the Federal Government.

(3) The Administrator may establish a Low-Noise-Emission Product Advisory Committee to assist him in determining which products qualify as low-noise-emission products for purposes of this section. The Committee shall include the Administrator or his designee, a representative of the National Bureau of Standards, and representatives of such other Federal agencies and private individuals as the Administrator may deem necessary from time to time. Any member of the Committee not employed on a full-time basis by the United States may receive the daily equivalent of the annual rate of basic pay in effect for grade GS-18 of the General Schedule for each day such member is engaged upon work of the Committee. Each member of the Committee shall be reimbursed for travel expenses, including per diem in lieu of subsistence as authorized by section 5703 of title 5, United States Code, for persons in the Government service employed intermittently.

(4) Certification under this section shall be effective for a period of one year from the date of issuance.

(5) (A) Any person seeking to have a class or model of product certified under this section shall file a certification application in accordance with regulations prescribed by the Administrator.

(B) The Administrator shall publish in the Federal Register a notice of each application received.

$1,000,000 for the fiscal year ending June 30, 1973, and $2,000,000 for each of the two succeeding fiscal years.

(h) The Administrator shall promulgate the procedures required to implement this section within one hundred and eighty days after the date of enactment of this Act.

JUDICIAL REVIEW; WITNESSES

Sec. 16. (a) A petition for review of action of the Administrator of the Environmental Protection Agency in promulgating any standard or regulation under section 6, 17, or 18 of this Act or any labeling regulation under section 8 of this Act may be filed only in the United States Court of Appeals for the District of Columbia Circuit, and a petition for review of action of the Administrator of the Federal Aviation Administration in promulgating any standard or regulation under section 611 of the Federal Aviation Act of 1958 may be filed only in such court. Any such petition shall be filed within ninety days from the date of such promulgation, or after such date if such petition is based solely on grounds arising after such ninetieth day. Action of either Administrator with respect to which review could have been obtained under this subsection shall not be subject to judicial review in civil or criminal proceedings for enforcement.

(b) If a party seeking review under this Act applies to the court for leave to adduce additional evidence, and shows to the satisfaction of the court that the information is material and was not available at the time of the proceeding before the Administrator of such Agency or Administration (as the case may be), the court may order such additional evidence (and evidence in rebuttal thereof) to be taken before such Administrator, and to be adduced upon the hearing, in such manner and upon such terms and conditions as the court may deem proper. Such Administrator may modify his findings as to the facts, or make new findings, by reason of the additional evidence so taken, and he shall file with the court such modified or new findings, and his recommendation, if any, for the modification or setting aside of his original order, with the return of such additional evidence.

(c) With respect to relief pending review of an action by either Administrator, no stay of an agency action may be granted unless the reviewing court determines that the party seeking such stay is (1) likely to prevail on the merits in the review proceeding and (2) will suffer irreparable harm pending such proceeding.

(d) For the purpose of obtaining information to carry out this Act, the Administrator of the Environmental Protection Agency may issue subpenas for the attendance and testimony of witnesses and the production of relevant papers, books, and documents, and he may administer oaths. Witnesses summoned shall be paid the same fees and mileage that are paid witnesses in the courts of the United States. In cases of contumacy or refusal to obey a subpena served upon any person under this subsection, the district court of the United States for any district in which such person is found or resides or transacts business, upon application by the United States and after notice to such person, shall have jurisdiction to issue an order requiring such person to appear and give testimony before the Administrator, to appear and produce papers, books, and documents before the Administrator, or both, and any failure to obey such order of the court may be punished by such court as a contempt thereof.

MOTOR CARRIER NOISE EMISSION STANDARDS

Sec. 18 (a) (1) Within nine months after the date of enactment of this Act, the Administrator shall publish proposed noise emission regulations for motor carriers engaged in interstate commerce. Such proposed regulations shall include noise emission standards setting such limits on noise emissions resulting from operation of motor carriers engaged in interstate commerce which reflect the degree of noise reduction achievable through the application of the best available technology, taking into account the cost of compliance. These regulations shall be in addition to any regulations that may be proposed under section 6 of this Act.

(2) Within ninety days after the publication of such regulations as may be proposed under paragraph (1) of this subsection, and subject to the provisions of section 16 of this Act, the Administrator shall promulgate final regulations. Such regulations may be revised from time to time, in accordance with this subsection.

(3) Any standard or regulation, or revision thereof, proposed under this subsection shall be promulgated only after consultation with the Secretary of Transportation in order to assure appropriate consideration for safety and technological availability.

(4) Any regulation or revision thereof promulgated under this subsection shall take effect after such period as the Administrator finds necessary, after consultation with the Secretary of Transportation, to permit the development and application of the requisite technology, giving appropriate consideration to the cost of compliance within such period.

(b) The Secretary of Transportation, after consultation with the Administrator, shall promulgate regulations to insure compliance with all standards promulgated by the Administrator under this section. The Secretary of Transportation shall carry out such regulations through the use of his powers and duties of enforcement and inspection authorized by the Interstate Commerce Act and the Department of Transportation Act. Regulations promulgated under this section shall be subject to the provisions of sections 10, 11, 12, and 16 of this Act.

(c) (1) Subject to paragraph (2) of this subsection but not withstanding any other provision of this Act, after the effective date of a regulation under this section applicable to noise emissions resulting from the operation of any motor carrier engaged in interstate commerce, no State or political subdivision thereof may adopt or enforce any standard applicable to the same operation of such motor carrier, unless such standard is identical to a standard applicable to noise emissions resulting from such operation prescribed by any regulation under this section.

(2) Nothing in this section shall diminish or enhance the rights of any State or political subdivision thereof to establish and enforce standards or controls on levels of environmental noise, or to control, license, regulate, or restrict the use, operation, or movement of any product if the Administrator, after consultation with the Secretary of Transportation, determines that such standard, control, license, regulation, or restriction is necessitated by special local conditions and is not in conflict with regulations promulgated under this section.

(d) For purposes of this section, the term "motor carrier" includes a common carrier by motor vehicle, a contract carrier by motor vehicle, and a private carrier of property by motor vehicle as those terms are defined by paragraphs (14), (15), and (17) of section 203 (a) of the Interstate Commerce Act (49 U.S.C. 303 (a)).

SECTION 8 OF THE QUIET COMMUNITIES ACT[1]

Sec. 8. (a) *The Secretary of Transportation and the Administrator of the Environmental Protection Agency shall jointly study the aircraft noise effects from an airport on communities located in a State other than the State in which the airport is located. The criteria to be used in selecting the airport to be studied shall include:*

(1) *the airport shall be operated by a State, a unit of general purpose local government of a State, or a special purpose entity constituted for the purpose of operating an airport, and*

(2) *the airport shall have a point on the airport boundary within one nautical mile from a State boundary, and*

(3) *the airport shall have had in excess of sixty thousand scheduled air carrier departures during the preceding calendar year.*

(b) *The study shall be conducted in cooperation with the airport operator, appropriate Federal, State, and local officials, and the appropriate Metropolitan Planning Organization.*

(c) *The Secretary and the Administrator shall prepare and submit to Congress a report within nine months of the conclusion of the study, but no later than twenty-four months after enactment of this section.*

[1]This section of the Quiet Communities Act does not amend the Noise Control Act of 1972. One other free-standing provision of the Quiet Communities Act of 1978 contained technical amendments to the Solid Waste Disposal Act. These solid waste amendments are not printed here.

Environmental Protection Agency
Abatement & Control
Washington, D.C. 20460
EPA 550/9-79-100

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EPA

Protective Noise Levels

Condensed Version of EPA Levels Document

PURPOSE

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This publication is intended to complement the EPA's "Levels Document,"* the 1974 report examining levels of environmental noise necessary to protect public health and welfare. It interprets the contents of the Levels Document in less technical terms for people who wish to better understand the concepts presented there, and how the protective levels were identified. In that sense, this publication may serve as an introduction, or a supplement, to the Levels Document.

*"Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety," EPA/ONAC 550/9-74-004, March, 1974.

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INTRODUCTION

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During the last 20 years there has been increasing concern with the quality of the environment. Along with air and water contaminants, noise has been recognized as a serious pollutant. As noise levels have risen, the effects of noise have become pervasive and more apparent.

Noise is defined as "unwanted sound." In the context of protecting the public health and welfare, noise implies adverse effects on people and the environment. Noise causes hearing loss, interferes with human activities at home and work, and is in various ways injurious to people's health and well-being. Although hearing loss is the most clearly measurable health hazard, noise is also linked to other physiological and psychological problems.

Noise annoys, awakens, angers and frustrates people. It disrupts communication and individual thoughts, and affects performance capability. Noise is one of the biological stressors associated with everyday life. Thus, the numerous effects of noise combine to detract from the quality of people's lives and the environment.

Noise emanates from many different sources. Transportation noise, industrial noise, construction noise, household noise, and people and animal noise are all large-scale offenders. It is important, then, to examine the total range and combination of noise sources and not to focus unduly on any one source.

Through the Noise Control Act of 1972, Congress directed the Environmental Protection Agency (EPA) to publish scientific information about the kind and extent of all identifiable effects of different qualities and quantities of noise. EPA was also directed to define acceptable levels under various conditions which would protect public health and welfare with an adequate margin of safety. The EPA collaborated with other Federal agencies and the scientific community to publish a "Levels Document,"* which would fulfill these requirements in the Noise Control Act.

Initial public reaction was quite favorable, but it was discovered that the document was too complex, too technical, and too long for some audiences. This summary presents the contents of the Levels Document in less technical terms. It defines the basic measurement of noise, analyzes noise exposure, and presents the best understood effects of noise — hearing damage, speech interference, and annoyance — using information contained in the Levels Document. The identified protective levels are then summarized, followed by a number of often-asked questions and answers about the Levels Document.

No attempt has been made here to incorporate recent research findings pertaining to effects of noise on people. Considerable new information has developed since initial publication of the Levels Document, including new findings on community response to noise, sleep disruption, and speech interference. Summaries and analyses of some recent information on noise effects are available through EPA and other agencies.

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*"Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety", EPA 550/9-74-004, March, 1974, U.S. Environmental Protection Agency, Washington, D.C. 20460.

ABOUT SOUND

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The sound we hear is the result of a sound source inducing vibration in the air. The vibration produces alternating band of relatively dense and sparse particles of air, spreading outward from the source in the same way as ripples do on water after a stone is thrown into it. The result of the movement of the particles is a fluctuation in the normal atmospheric pressure, or sound waves. These waves radiate in all directions from the source and may be reflected and scattered or, like other wave actions, may turn corners. When the source stops vibrating, the sound waves disappear almost instantaneously, and the sound ceases. The ear is extremely sensitive to sound pressure fluctuations, which are converted into auditory sensations.

Sound may be described in terms of three variables:

1. Amplitude (perceived as loudness)
2. Frequency (perceived as pitch)
3. Time pattern

Amplitude

Sound pressure is the amplitude or measure of the difference between atmospheric pressure (with no sound present) and the total pressure (with sound present). Although there are other measures of sound amplitude, sound pressure is the fundamental measure and is the basic ingredient of the various measurement descriptors in the next section, "Measurement of Environmental Noise."

The unit of sound pressure is the decibel (dB); thus it is said that a sound pressure level is a certain number of decibels. The decibel scale is a logarithmic scale, not a linear one such as the scale of length. A logarithmic scale is used because the range of sound intensities is so great that it is convenient to compress the scale to encompass all the sounds that need to be measured. The human ear has an extremely wide range of response to sound amplitude. Sharply painful sound is 10 million times greater in sound pressure than the least audible sound. In decibels, this 10 million to 1 ratio is simplified logarithmically to 140 dB.

Another unusual property of the decibel scale is that the sound pressure levels of two separate sounds are not directly (that is, arithmetically) additive. For example, if a sound of 70 dB is added to another sound of 70 dB, the total is only a 3-decibel increase (to 73 dB), not a doubling to 140 dB. Furthermore, if two sounds are of different levels, the lower level adds less to the higher as this difference increases. If the difference is as much as 10 dB, the lower level adds almost nothing to the higher level. In other words, adding a 60 decibel sound to a 70 decibel sound only increases the total sound pressure level less than one-half decibel.

Frequency

The rate at which a sound source vibrates, or makes the air vibrate, determines frequency. The unit of time is usually one second and the term "Hertz" (after an early investigator of the physics of sound) is used to designate the number of cycles per second.

The human ear and that of most animals has a wide range of response. Humans can identify sounds with frequencies from about 16 Hz (Hertz) to 20,000 Hz. Because pure tones are relatively rare in real-life situations, most sounds consist instead of a complex mixture of many frequencies.

Time Pattern

The temporal nature of sound may be described in terms of its pattern of time and level: continuity, fluctuation, impulsiveness, intermittency. Continuous sounds are those produced for relatively long periods at a constant level, such as the noise of a waterfall. Intermittent sounds are those which are produced for short periods, such as the ringing of a telephone or aircraft take-offs and landings. Impulse noises are sounds which are produced in an extremely short span of time, such as a pistol shot or a hand clap. Fluctuating sounds vary in level over time, such as the loudness of traffic sounds at a busy intersection.

MEASUREMENT OF ENVIRONMENTAL NOISE: SOUND DESCRIPTORS

EPA has adopted a system of four "sound descriptors" to summarize how people hear sound and to determine the impact of environmental noise on public health and welfare. These four descriptors are: the A-weighted Sound Level, A-weighted Sound Exposure Level, Equivalent Sound Level, and Day-Night

Sound Level. They are related but each is most useful for a particular type of measurement. The descriptors and some examples of their uses are described below.

A-weighted Sound Level

One's ability to hear a sound depends greatly on the frequency composition of the sound. People hear sounds most readily when the predominant sound energy occurs at frequencies between 1000 and 6000 Hertz (cycles per second). Sounds at frequencies above 10,000 Hertz (such as high-pitched hissing) are much more difficult to hear, as are sounds at frequencies below about 100 Hz (such as a low rumble). To measure sound on a scale that approximates the way it is heard by people, more weight must be given to the frequencies that people hear more easily.

A method for weighting the frequency spectrum to mimic the human ear has been sought for years. Many different scales of sound measurement, including A-weighted sound level (and also B, C, D, and E-weighted sound levels) have evolved in this search. A-weighting was recommended by EPA to describe environmental noise because it is convenient to use, accurate for most purposes, and is used extensively throughout the world. Figure 1 shows the A-weighted levels of some environmental noises. Note that these ranges of measured values are the maximum sound levels.

The A-weighting of frequency also is used in the three descriptors discussed below. When used by itself, an A-weighted decibel value denotes either a sound level at a given instant, a maximum level, or a steady-state level. The following three descriptors are used to summarize those levels which vary over time.

Sound Exposure Level

Since the levels of many sounds change from moment to moment, this variation must also be accounted for when measuring environmental noise. One method for measuring the changing magnitude of sound levels is to trace a line on a sheet of moving paper, so that the movement of the pen is proportional to the sound level in decibels. Figure 2 illustrates such a recording, about which several features are noteworthy. First, the sound level varies with time over a range of about 30 dB. Second, the sound appears to be characterized by a fairly steady-state lower level, upon which are superimposed sound levels associated with individual events. This fairly constant lower level is often called the background ambient sound level.

Each single event in Figure 2 may be partially characterized by its maximum level. It may also be partially characterized by its time pattern. In the example, the sound level of the aircraft is above that of the background ambient level for about a minute, whereas the sound levels from cars are above the background level for much less time.

The duration of sounds with levels that vary from moment to moment is more difficult to characterize. One way is to combine the maximum sound level with the length of time during which the sound level is greater than a certain number of decibels below the maximum level — for example, the number of seconds that the sound rises from 10 dB below maximum, as in Figure 3.

Using this procedure one can measure the total energy of the sound by summing the intensity during the exposure duration. This procedure produces the second measurement descriptor, *sound exposure level* (L_s), referred to in the Levels Document as the single event noise exposure level (SENEL).

Equivalent Sound Level

Yet another method of quantifying the noise environment is to determine the value of a steady-state sound which has the same A-weighted sound energy as that contained in the time-varying sound. This is the third measurement descriptor, termed the *Equivalent Sound Level* (L_{eq}). The Equivalent Sound Level is a single value of sound level for any desired duration, which includes *all* of the time-varying sound energy in the measurement period. In Figure 2, for example, the L_{eq} equals about 58 dB, indicating that the amount of sound energy in all the peaks and valleys in the figure is equivalent to the energy in a continuous sound of 58 dB.

The major virtue of the Equivalent Sound Level is that it correlates reasonably well with the effects of noise on people, even for wide variations in environmental sound levels and time patterns. It is used when only the durations and levels of sound, and not their times of occurrence (day or night), are relevant. It is easily measurable by available equipment. It also is the basis of a fourth and final measurement descriptor of the total outdoor noise environment, the *Day-Night Sound Level* (L_{dn}).

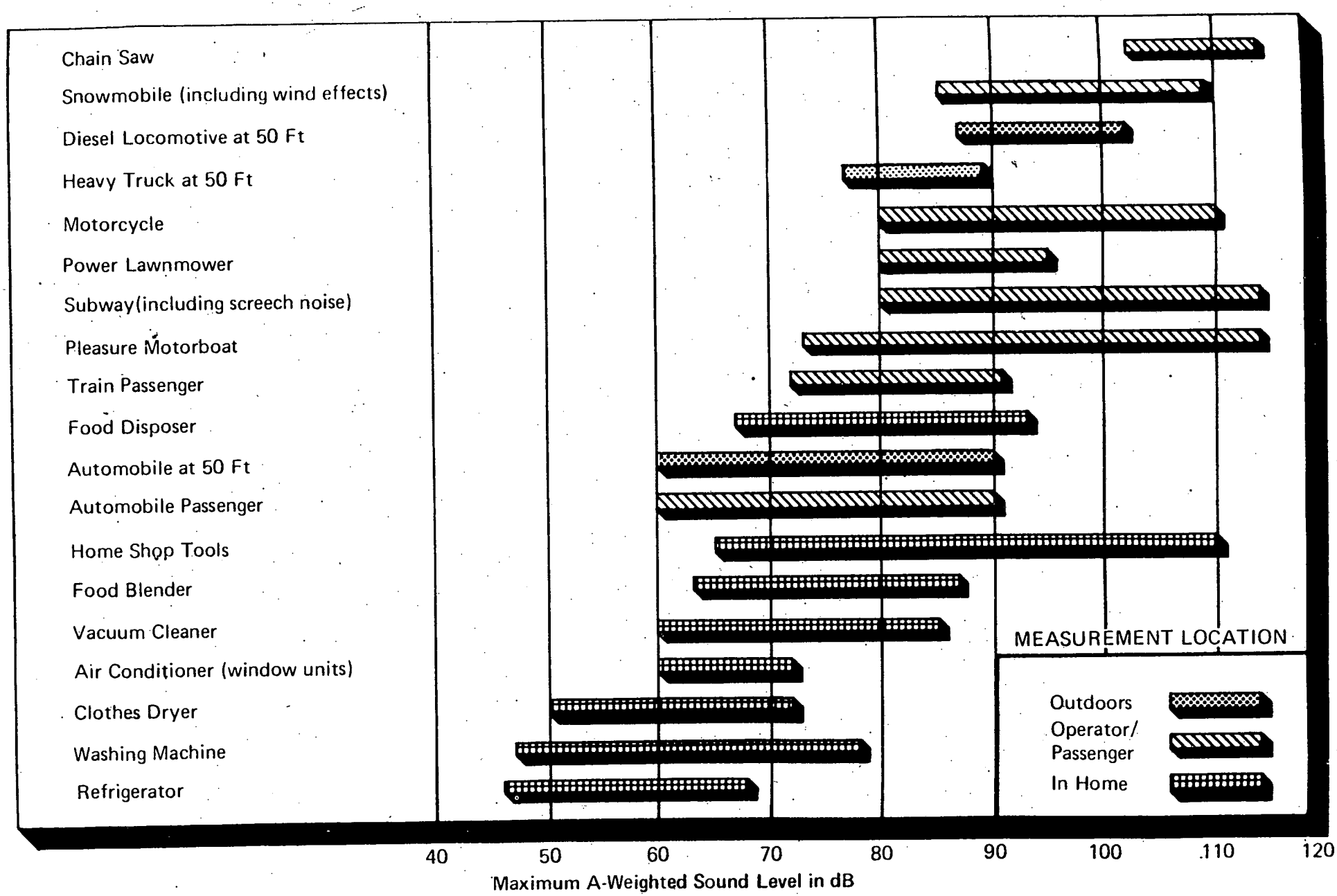

FIGURE 1. TYPICAL RANGE OF COMMON SOUNDS

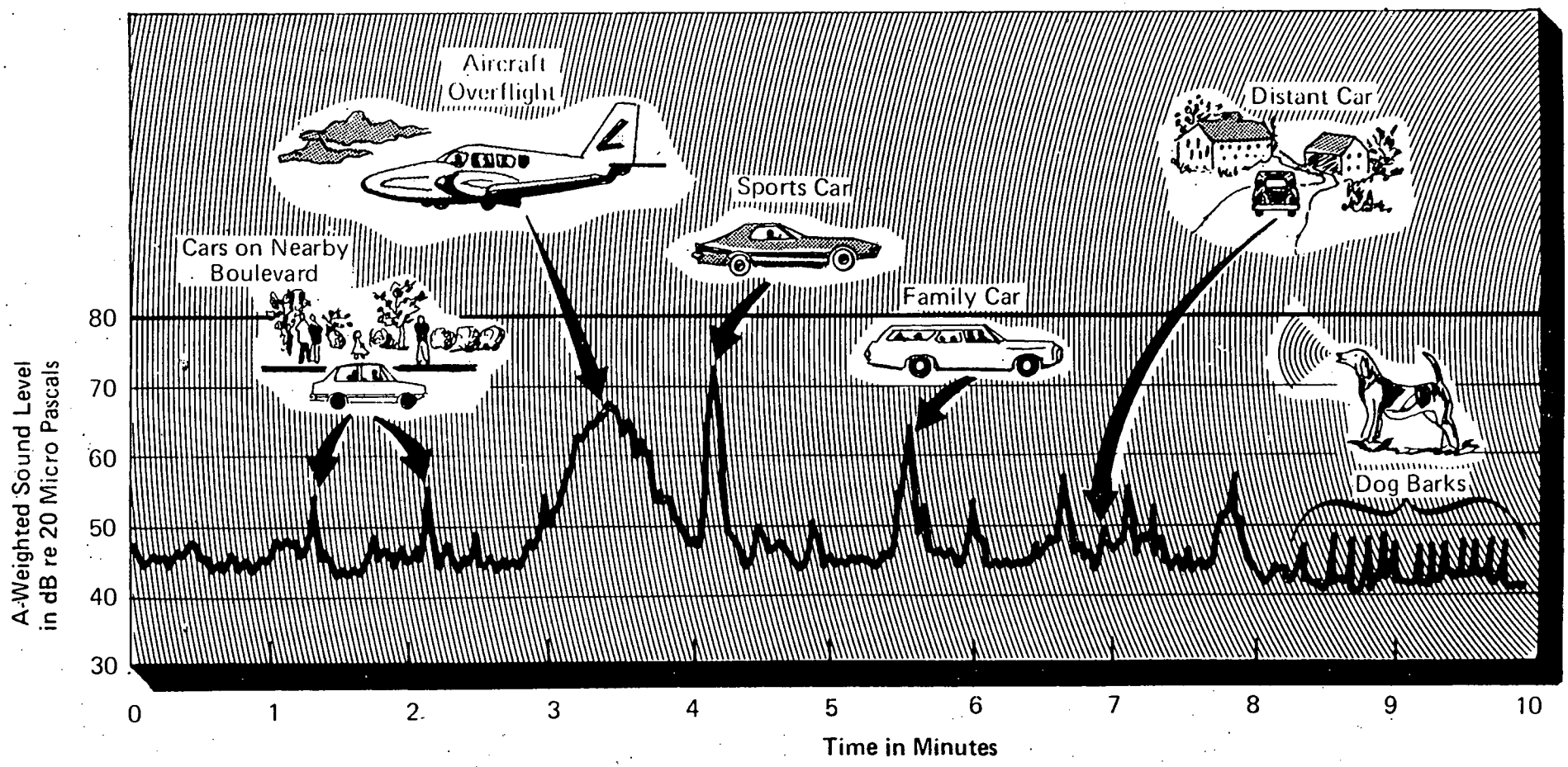

FIGURE 2. TYPICAL OUTDOOR SOUND MEASURED ON A QUIET SUBURBAN STREET

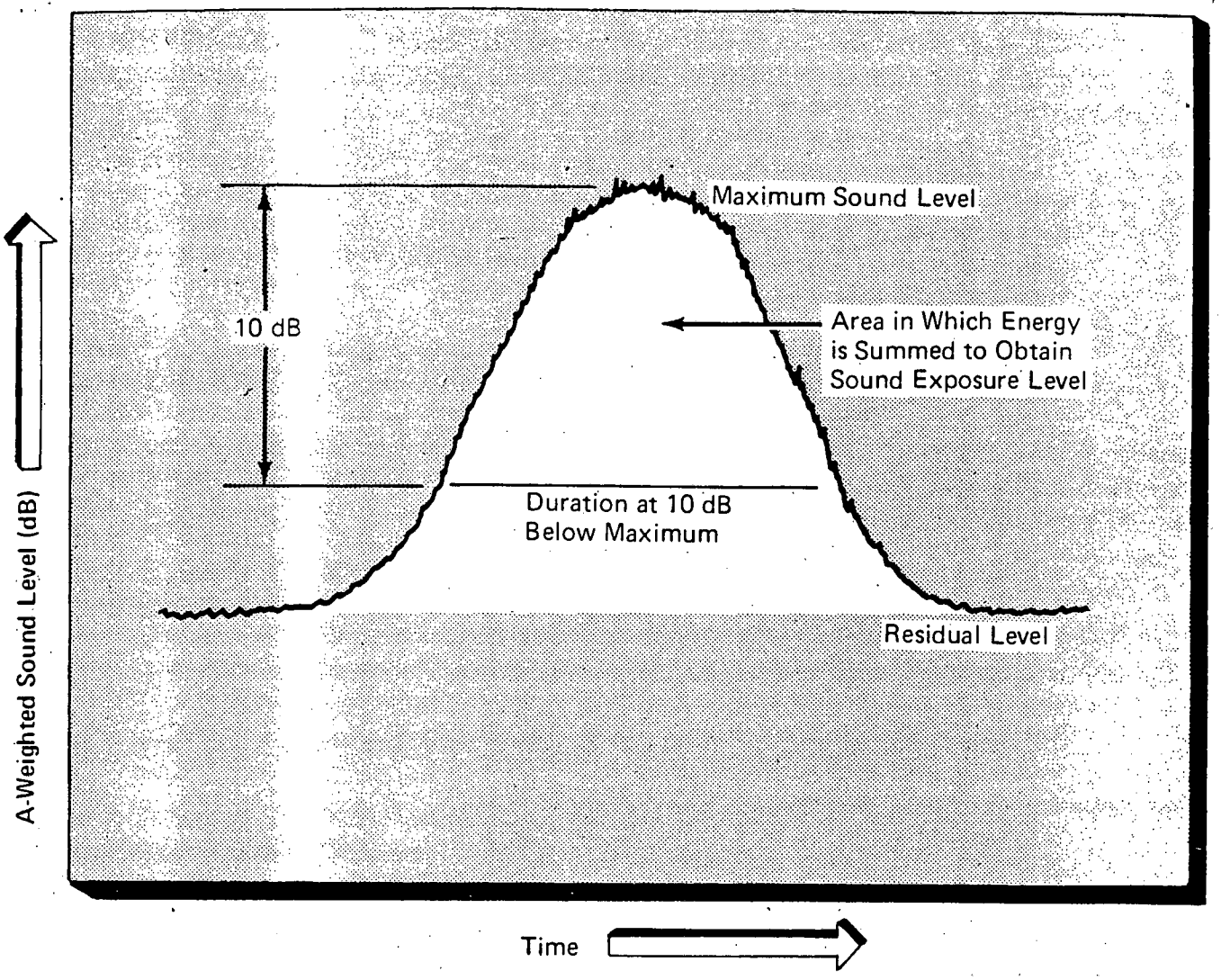

FIGURE 3. DESCRIPTION OF THE SOUND OF A SINGLE EVENT

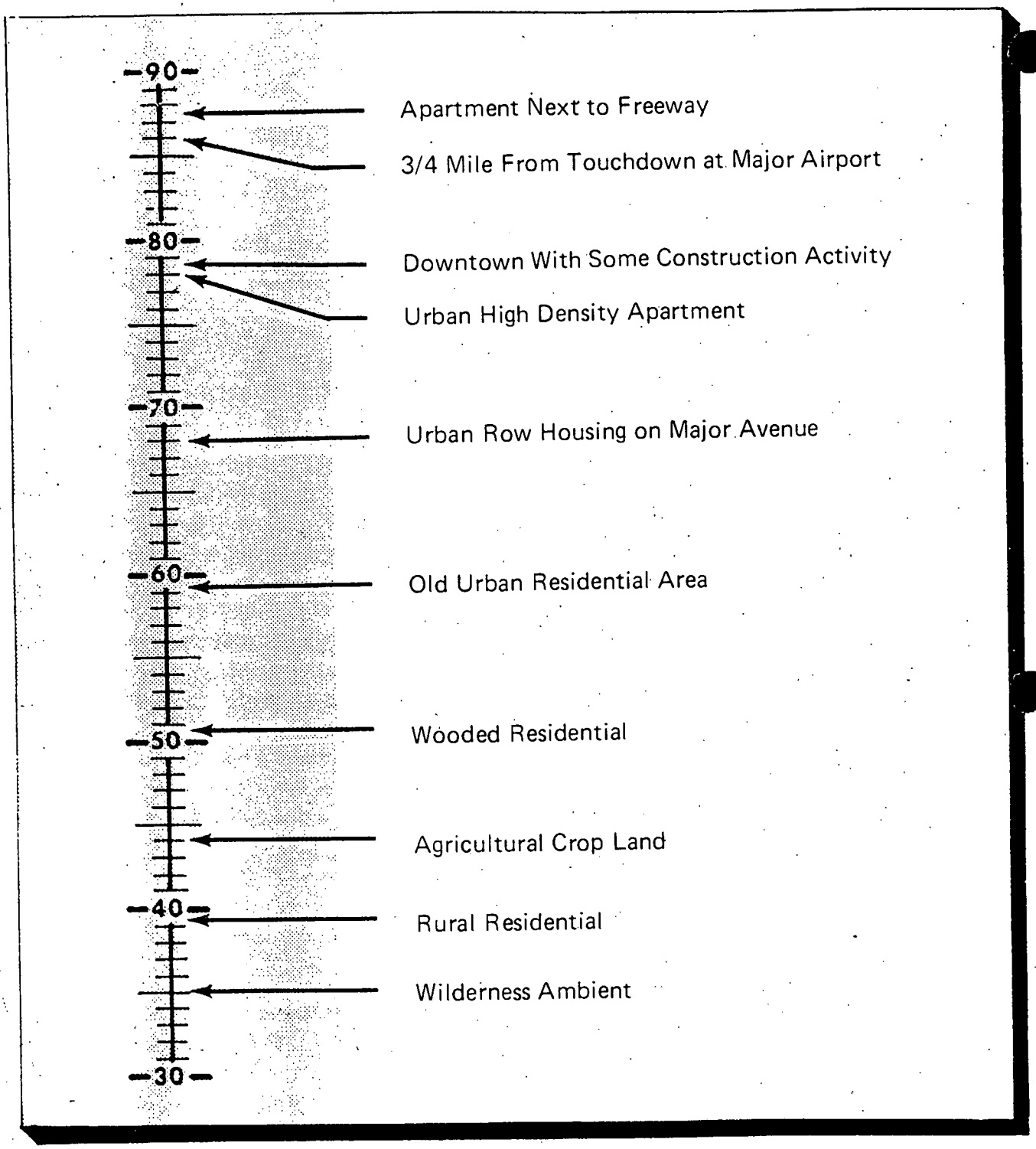

FIGURE 4. EXAMPLES OF OUTDOOR DAY-NIGHT AVERAGE SOUND LEVELS IN dB MEASURED AT VARIOUS LOCATIONS

Day-Night Sound Level

The Day-Night Sound Level is the A-weighted equivalent sound level for a 24-hour period with an additional 10 dB weighting imposed on the equivalent sound levels occurring during nighttime hours (10 pm to 7 am). Hence, an environment that has a measured daytime equivalent sound level of 60 dB and a measured nighttime equivalent sound level of 50 dB, can be said to have a weighted nighttime sound level of 60 dB (50 + 10) and an L_{dn} of 60 dB. Examples of measured L_{dn} values are shown in Figure 4. Table I summarizes the use of the four sound descriptors used by EPA.

Table I. Descriptors of Sound*

TYPICAL USE	NAME OF DESCRIPTOR	NATURE OF DESCRIPTOR
To describe steady airconditioning sound in a room or measure maximum sound level during a vehicle passby with a simple sound level meter.	A-weighted Sound Level	The momentary magnitude of sound weighted to approximate the ear's frequency sensitivity.
To describe noise from a moving source such as an airplane, train, or truck.	A-weighted Sound Exposure Level	A summation of the energy of the momentary magnitudes of sound associated with a single event to measure the total sound energy of the event.
To measure average environmental noise levels to which people are exposed.	Equivalent Sound Level	The A-weighted sound level that is "equivalent" to an actual time varying sound level, in the sense that it has the same total energy for the duration of the sound.
To characterize average sound levels in residential areas throughout the day and night.	Day-Night Sound Level	The A-weighted equivalent sound level for a 24-hour period with 10 decibels added to nighttime sounds (10 pm - 7 am).

*The unit for all descriptors is the decibel.

LEVELS OF ENVIRONMENTAL NOISE IN THE UNITED STATES

In residential areas of the United States, major contributions to outdoor noise come from transportation, industrial, construction, human and animal sources. Inside homes, appliances, radio and television, as well as people and animals, are predominant noise sources. On the job, workplace equipment can create moderate to extremely high levels of noise. The daily noise exposure of people depends on how much time they spend in different outdoor and indoor locations and on the noise environments in these places. Typical daily exposure patterns are discussed in this section, following short descriptions of outdoor and indoor levels of environmental noise throughout the United States.

Outdoor Levels

The noise environment outside residences in the United States can be highly variable. As seen in Figure 4, outdoor Day-Night Sound Levels in different areas vary over a range of 50 dB. Levels occur as low as L_{dn} = 30 to 40 dB in wilderness areas and as high as L_{dn} = 85 to 90 dB in urban areas.

Most Americans live in areas with a much smaller ranger of outdoor noise levels. Figure 5 shows that for urban dwellers (roughly 135 million people, more than half the U.S. population), 87% live in areas of L_{dn} = 48 and higher from traffic noise alone. Most of the other 13% of the urban population experience lower noise levels than those of Figure 5. Figure 5 also shows that nearly half of the urban population live in areas exposed to traffic sounds that range over only 5 dB (L_{dn} = 55 to 60 dB). Rural populations enjoy average outdoor sound levels generally lower than L_{dn} = 50 dB.

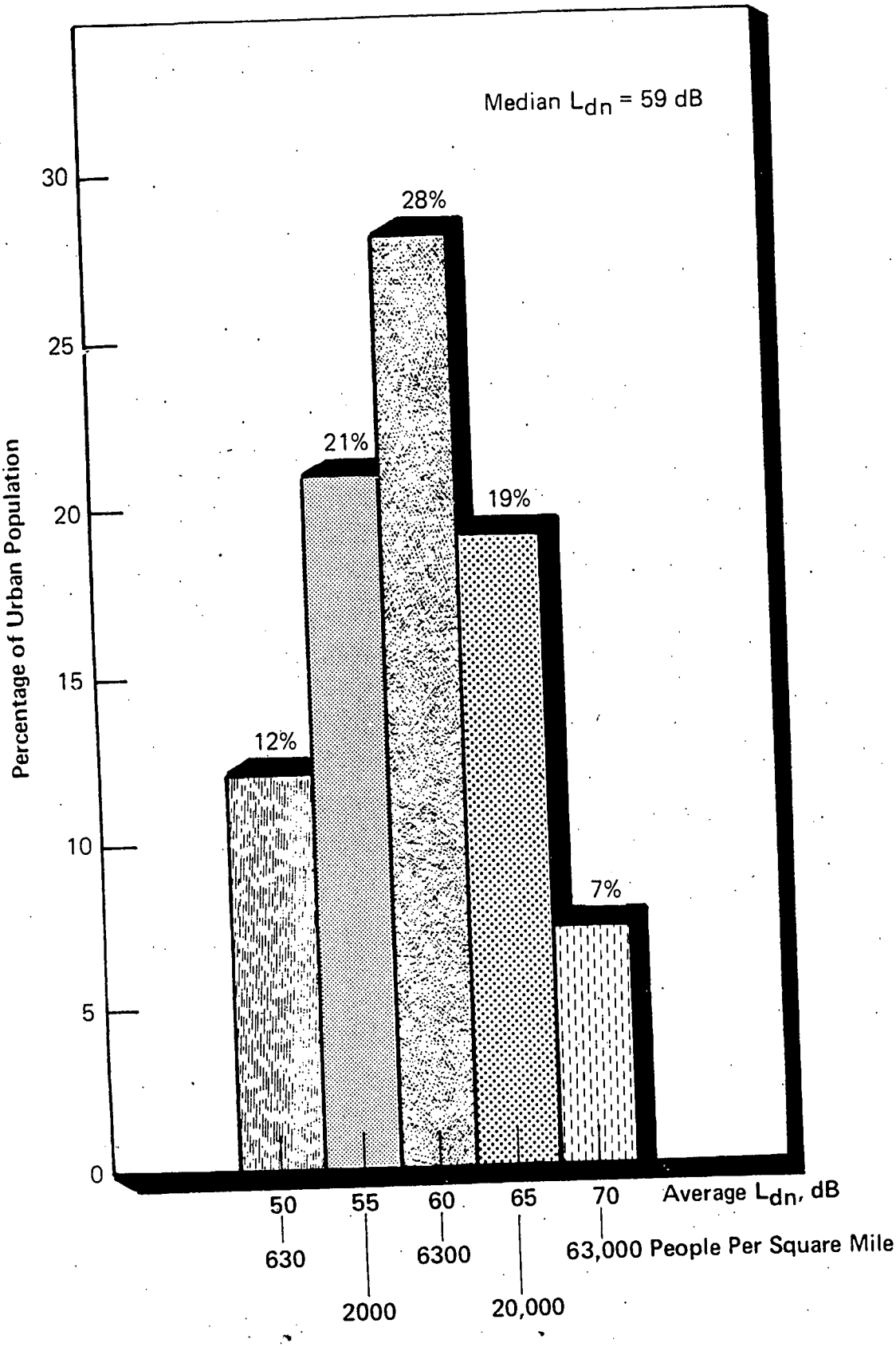

FIGURE 5. ESTIMATED PERCENTAGE OF URBAN POPULATION EXPOSED TO OUTDOOR DAY-NIGHT SOUND LEVELS DUE TO TRAFFIC

It is useful to know the number of people living in areas characterized by different levels of environmental noise. Figure 6 presents estimates for urban traffic, freeway traffic, and aircraft noise. The figure shows that urban traffic noise is much more widespread than either aircraft or freeway noise, but the figures are not strictly additive, because many of the people counted in one category are also exposed to another category of noise. Fifty-nine million people live in areas with urban traffic noise of L_{dn} = 60 dB or higher, in contrast to only 16 million and 3.1 million people who live in areas with outdoor levels of L_{dn} = 60 dB or higher for aircraft and freeway noise, respectively. On the other hand, more people are exposed to higher levels of noise from freeway and aircraft operations than from urban traffic: about 300,000 people live in areas exposed to levels of L_{dn} = 80 dB or higher from freeway traffic; 200,000 from aircraft operations; and 100,000 from urban traffic. Bear in mind, however, that there may be differences between individual at-ear exposure levels and outdoor levels, because people move from place to place for varying amounts of time.

Relationship Between Indoor and Outdoor Levels

The contribution of outdoor noise to indoor noise levels is usually small. That part of a sound level within a building caused by an outdoor source obviously depends on the source's intensity and the sound level reduction afforded by the building. Although the sound level reduction provided by different buildings differs greatly, dwellings can be categorized into two broad classes—those built in warm climates and those built in cold climates. Further, the sound level reduction of a building is largely determined by whether its windows are open or closed. Table II shows typical sound level reductions for these categories of buildings and window conditions, as well as an approximate national average sound level reduction.

Table II
Typical Sound Level Reductions of Buildings

	Windows Opened	Windows Closed
Warm Climate	12 dB	24 dB
Cold Climate	17 dB	27 dB
Approximate National Average	15 dB	25 dB

Sample measurements of outdoor and indoor noise levels during 24-hour periods are depicted in Figure 7. Despite the sound level reduction of buildings, indoor levels are often comparable to or higher than levels measured outside. Thus, indoor levels often are influenced primarily by internal noise sources such as appliances, radio and television, heating and ventilating equipment, and people. However, many outdoor noises may still annoy people in their homes more than indoor noises do. Indeed, people sometimes turn on indoor sources to mask the noise coming from outdoors.

An example of the range of hourly sound levels measured inside living areas in plotted for each hour of the day in Figure 8. The figure shows the median levels and the range of levels observed for 80% of the data. During late night hours the typical hourly sound level was approximately 36 dB. This level was probably dominated by outdoor noise. However, during the day, the hourly average levels ranged from about 40 to 70 dB, indicating the wide range of activities in which people engage.

INDIVIDUAL NOISE EXPOSURE PATTERNS

During a 24-hour period, people are exposed to a wide range of noises, including noise at home, work, school, places of recreation, shopping establishments, and while enroute to these or other locations. Clearly, no single exposure pattern can be typical of all people, or even of those people who follow a common life style. Figure 9 shows hypothetical exposure patterns for broad classes of people. From these levels and some assumptions about the hours spent at different daytime activities, 24-hour average sound levels can be estimated for factory and office workers, housewives, and preschool and school-age children. Estimates based on these assumptions are found in Table III.

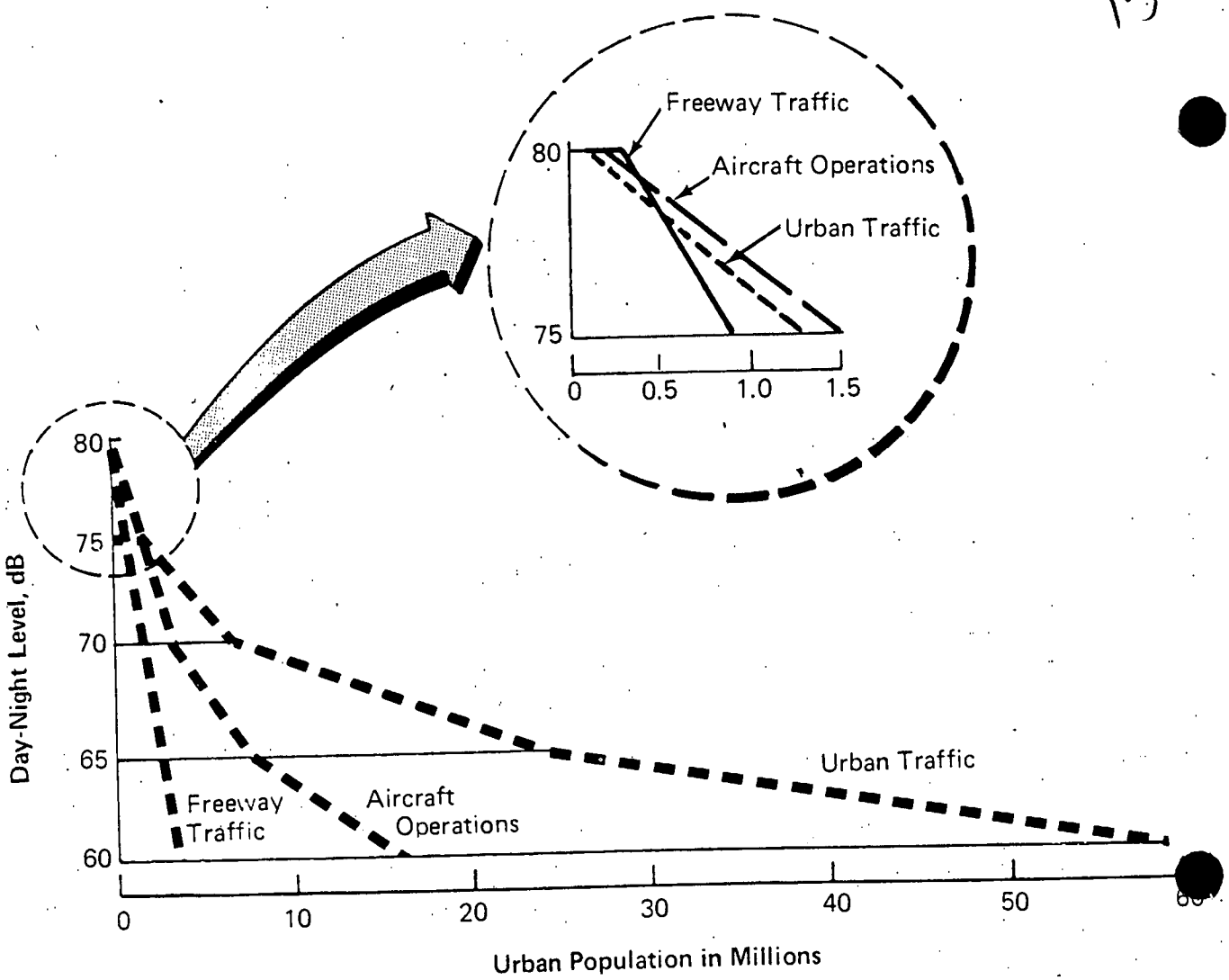

FIGURE 6. CUMULATIVE NUMBER OF PEOPLE IN URBAN AREAS EXPOSED TO OUTDOOR DAY-NIGHT AVERAGE SOUND LEVELS FROM DIFFERENT SOURCES

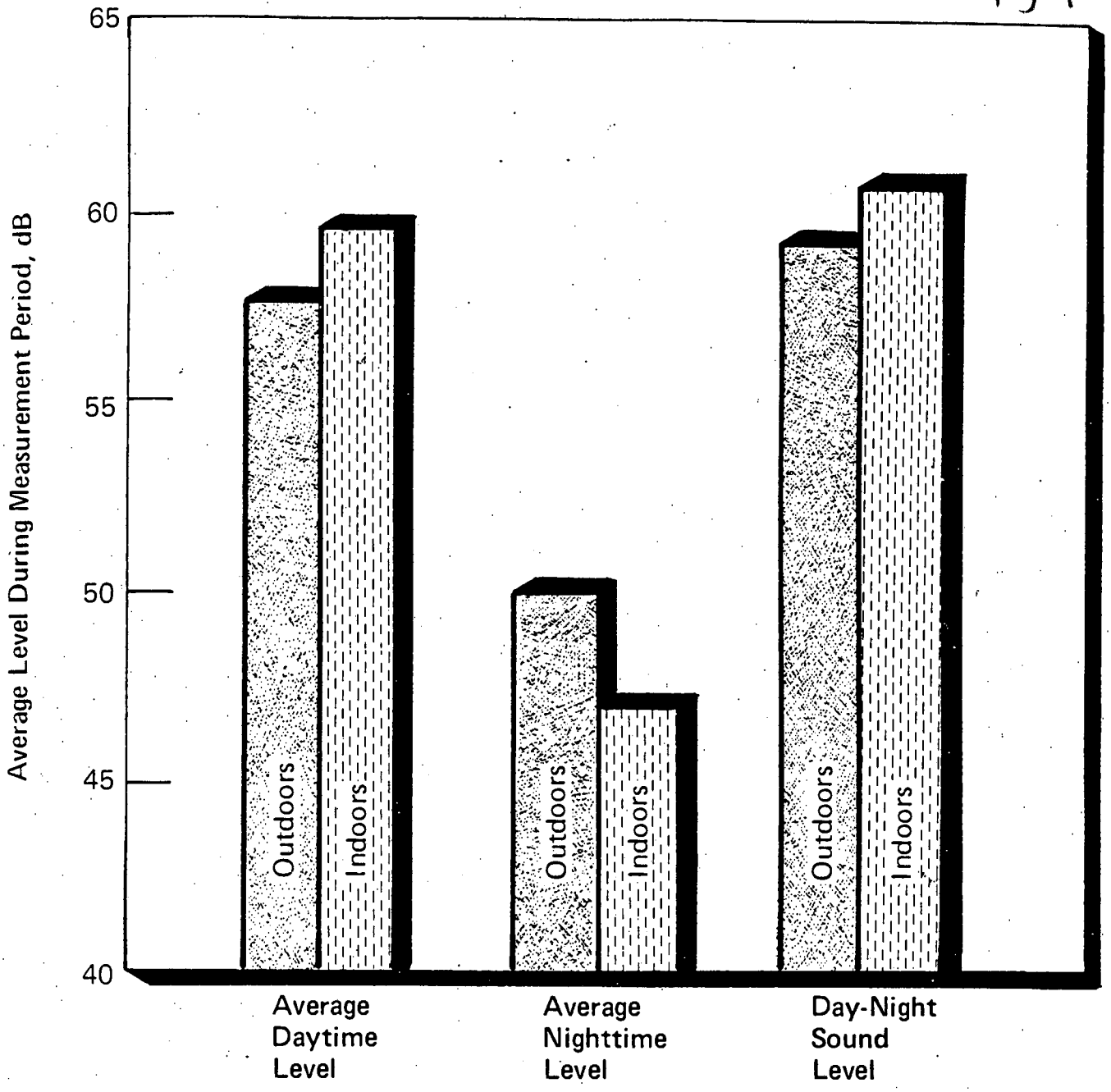

FIGURE 7. COMPARISON OF SAMPLE OUTDOOR AND INDOOR AVERAGE RESIDENTIAL SOUND LEVELS

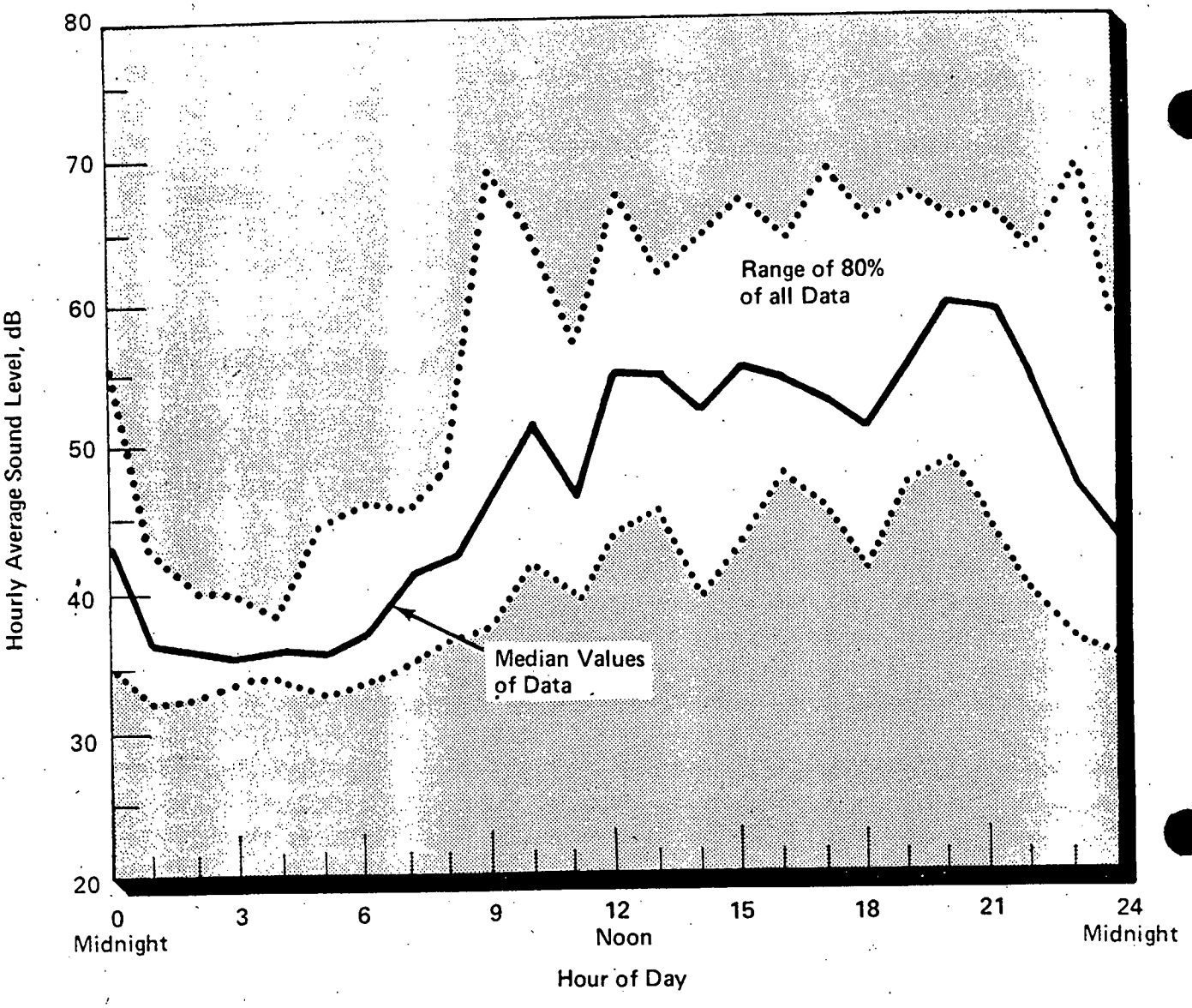

FIGURE 8. TIME PATTERN OF HOURLY INDOOR RESIDENTIAL SOUND LEVELS

For most people, nighttime noises do not contribute significantly to the 24-hour average. For many, the 24-hour average is determined primarily by the noise exposure of a single activity, frequently occurring for a short period of time.

Table III
Hypothetical Examples of Noise Exposures of Individuals

	24-Hour Average Sound Level, dB	
Individual	Suburban Environment	Urban Environment
Factory Worker	87	87
Office Worker	72	70
Housewife	64	67
School Child	77	77

HEARING DAMAGE FROM ENVIRONMENTAL NOISE

There is no question that exposure to certain levels of noise can damage hearing. However, determining exposure levels that protect hearing with an adequate margin of safety is a complicated matter.

This is because hearing is a complex ability that cannot be summarized by a single number in the way an individual's height or weight can be described. In fact, sizeable differences exist between individuals' hearing abilities. Hearing acuity tends to change progressively with age. Also, environmental noise exposure may vary considerably from moment to moment, so that specification of protective levels should include dynamic considerations. Further, relationships between hearing damage and noise exposure must be inferred, since available scientific information was gathered from groups of people who differed not only in noise exposure, but also in other important ways. Finally, individual and group noise exposures (especially over a working lifetime) are rarely known with precision.

In reaching conclusions about hearing loss, then, one must rely to a degree on assumptions, hypotheses, and extrapolations from existing data. Since complete agreement within the scientific community on these matters is lacking, an attempt was made in the Levels Document to consider alternative assumptions and hypotheses to ensure that the methods used to derive protective levels were based on the most defensible practice. As new data become available these levels may change slightly.

Basic Premises Involved in Determining Protective Levels

1. Changes in ability to hear in the region of 4000 Hz are the most important signs of irreversible hearing loss, indicating actual physiological destruction within the hearing mechanism. This frequency is usually the first frequency affected when the ear is damaged by exposure to noise. Furthermore, the protection of hearing acuity at this frequency is critical for understanding of speech and appreciation of music and other sounds.
2. Changes in individual hearing level, like changes in height or weight, are only significant if they are sizeable. Changes smaller than 5 dB are considered insignificant.
3. At all ages, it is assumed that hearing acuity cannot be damaged by sounds that cannot be heard. This may be important in that aging and other causes may produce appreciable shifts in hearing.
4. Because hearing ability varies from person to person, recommendations must be made in terms of a critical percentage of the population, ranked with superior hearing over the remainder. EPA's recommendations were based on the 96th percentile—that is, on providing protection for 96% of the people. It is assumed that people with poorer hearing than the 96th percentile are not affected by noise of typical levels (see 3 above), so that the recommendations protect virtually the entire population.
5. An individual's total noise exposure is evaluated by an "equal energy" rule: two noise exposures are expected to produce equal hearing loss if the product of exposure intensity and exposure time are equal. This rule allows a 3-dB decrease in sound pressure level (expressed in dB) for each doubling of the duration. Thus an exposure of 76 dB for one hour is equivalent to 73 dB for two hours, or 70 dB for four hours. This procedure is probably accurate for exposures of 30 minutes or more. It is also more protective for very short exposures and for noise that fluctuates greatly in level.

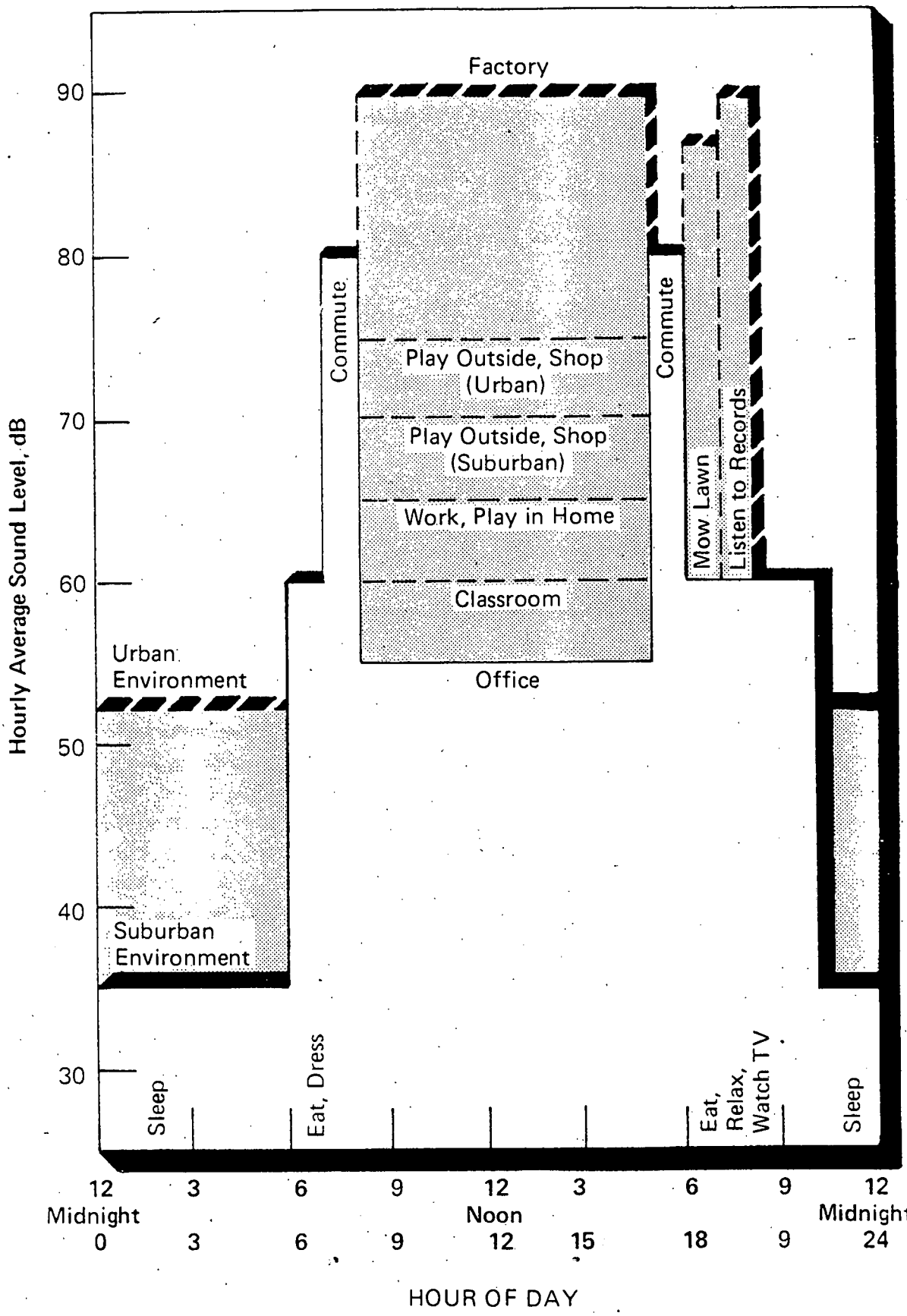

FIGURE 9. GENERALIZED INDIVIDUAL NOISE EXPOSURE PATTERNS

6. Intermittent noise produces less hearing damage than the "equal energy" rule would predict. To be considered intermittent for this purpose, a noise must fall below 65 dB for 10% of each hour and have peaks that exceed the background level by 5 to 15 dB. Intermittent noise is assumed to produce 5 dB less effect than does continuous noise of the same average level.

Calculation of the Maximum Allowable Noise Exposure

Three major scientific studies have attempted to assess hearing damage for various noise exposures. All are based on a comparison of groups of noise-exposed people and comparable non-exposed groups. All three studies attempted to predict hearing loss as a function of noise exposure of a certain percentage of people. Because these studies were of exposure to high-level noise, extrapolations of the data were necessary to estimate the protective exposure level that would produce minimal hearing loss: less than 5 dB at 4000 Hz for 96% of the people.

Forty years of exposure (250 working days per year) to a noise level of 73 dB for 8 hours per day was calculated to produce a hearing loss smaller than 5 dB for 96% of the people. This is the basic datum used to calculate hearing-protective levels of noise exposure. To use it in specific situations, certain corrections must be applied. One correction is to determine the yearly (rather than working day) level (250 to 365 days). This consideration amounts to a reduction 1.6 dB. Another correction, based on exposure on a 24-hour rather than 8-hour basis, produces an additional reduction of 5 dB.

Table IV contains at-ear noise exposure levels that produce negligible hearing losses for both 8-hour and 24-hour exposure on a yearly and working day basis. The 8-hour calculation assumes the remaining 16 hours of the day are spent in relative quiet.

Since an individual often experiences intense noise exposure outside of working hours (for example, while using noisy appliances or pursuing noisy recreation), protection on a 24-hour basis 365 days per year requires exposure of an intermittent variety at an equivalent level of less than 71.4 dB. This value is rounded to 70 dB to provide a slight margin of safety. Exposure to greater levels would produce more than 5 dB hearing loss in at least some of the population.

Table IV
(At-Ear) Exposure Levels that Produce No More Than
5 dB Noise-Induced Hearing Damage Over a 40-Year Period

		Steady (Continuous) Noise	Intermittent Noise	With Margin of Safety
L_{eq}, 8 hour	250 day/year	73	78	
	365 day/year	71.4	76.4	75
L_{eq}, 24 hour	250 day/year	68	73	
	365 day/year	66.4	71.4	70

Discussion of Assumptions

Several assumptions have been made in calculating the 24-hour yearly hearing-protective level of 70 dB. It is reasonable to ask how alternative assumptions would affect this level, and what the range of error might be.

Q. How would the recommended level be affected by a change in the percentage of the population protected?

A. Reducing the 96th percentile value to the 50th percentile (i.e., protecting half the population) would increase the protective level value from 70 dB to 77 dB.

Q. Since agreement on the value of the intermittency correction is imperfect, what other values might be used?

A. The estimated intermittency correction used in the Levels Document is 5 dB. The true intermittency correction is probably within the range 0 to 15 dB.

Q. How accurate is the equal energy assumption?

A. The equal energy assumption when applied to the long times (8 hours to 24, or 250 to 365 days) is fairly accurate. It may be subject to error when applied to short exposures of extreme level.

Q. How meaningful are the basic studies of hearing damage risk?
A. The probable errors of estimates in the three basic studies cannot be stated with absolute accuracy. There are a number of problems in extrapolating percentages of the population damaged from relatively high exposure levels to the protective level. Also, there is the problem of determining the amount of hearing damage when the control (non-exposed) population is subject to high levels of non-occupational noise. Thus, the 70 dB protective level is simply the best present estimate, subject to change if better data become available.

SPEECH COMMUNICATION

Communication is an essential element of human society, and speech is its most convenient form of expression. Interference with speech can degrade living directly, by disturbing normal social and work-related activities, and indirectly, by causing annoyance and stress. Sometimes the communications disturbed by noise are of vital importance, such as warning signals or cries for assistance. Prolonged speech interference and resulting annoyance are clearly not consistent with public health and welfare.

Speech interference from environmental noise can occur at home, at work, during recreation, inside vehicles, and in many other settings. Of chief concern for current purposes are the effects of noise on face-to-face conversations (indoors and outdoors), telephone conversations, and radio or television use.

The degree to which noise disturbs speech depends not only on physical factors (such as noise levels, vocal effort, distances between talkers and listeners, and room acoustics), but also on non-physical factors. The latter include the speaker's enunciation, the familiarity of the listener with the speaker's vocabulary and accent, the topic of conversation, the listener's motivation, and the hearing acuity of the listener. Years of research on speech intelligibility have produced considerable information about how these factors interact. Accurate predictions of speech intelligibility can be based on average noise levels and distances between speakers and listeners.

Speech Interference Indoors

The solid line in Figure 10 shows the effects of steady masking noise on sentence intelligibility for persons with normal hearing in a typical living room. At distances greater than about one meter from the speaker, the level of speech is fairly constant throughout the room.

The highest noise level that permits relaxed conversation with 100% sentence intelligibility throughout the room is 45 dB. People tend to raise their voices when the background noise exceeds 45-50 dB.

Speech Interference Outdoors

The sound level of speech outdoors decreases with increasing distance between speaker and listener. Table V shows distances between speaker and listener for satisfactory outdoor speech intelligibility at two levels of vocal effort in steady background noise levels.

The levels for normal and raised-voice "satisfactory conversation" shown in Table V permit sentence intelligibility of 95% at each distance. Ninety-five percent sentence intelligibility usually permits reliable communication because of the redundancy in normal conversation.

If the noise levels in Table V are exceeded, the speaker and listener must either move closer together or expect reduced intelligibility. For example, consider a conversation at normal vocal effort at a distance of three meters in a steady background noise of 56 dB. If the background level increases to 66 dB, the speakers either will have to move closer (to one meter apart) to maintain the same intelligibility, or alternatively, raise their voices appreciably. If they remain three meters apart without raising their voices, speech intelligibility would drop considerably.

Table V
Steady A-weighted Sound Levels That Allow Communication with 95 Percent Sentence Intelligibility Over Various Distances Outdoors for Different Voice Levels

VOICE LEVEL	COMMUNICATION DISTANCE (meters)					
	0.5	1	2	3	4	5
Normal Voice (dB)	72	66	60	56	54	52
Raised Voice (dB)	78	72	66	62	60	58

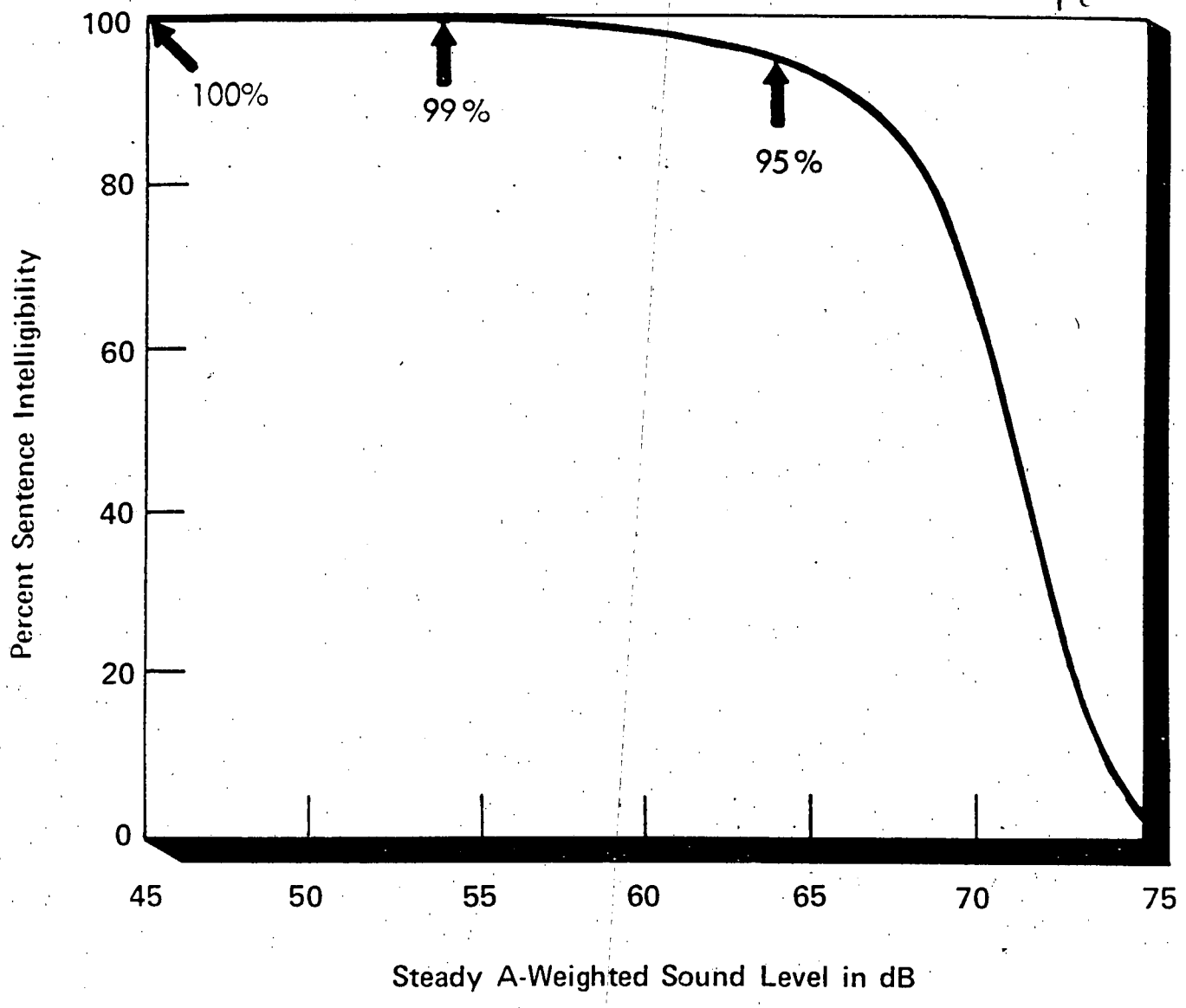

FIGURE 10. INDOOR SENTENCE INTELLIGIBILITY

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Discussion

In summary, an L_{dn} of 45 dB permits virtually 100% intelligibility inside buildings. Assuming that a typical home reduces outdoor noise by 15 dB, the outdoor noise level should be no greater than L_{dn} = 60 dB to permit 100% intelligible speech indoors. Allowing a 5 dB margin of safety, the outdoor level should be L_{dn} = 55 dB. This outdoor level would also guarantee sentence intelligibility of 95% outdoors with normal voice levels at a distance of three meters.

Q. What do percentages of sentence intelligibility signify?

A. A given percentage of sentence intelligibility, such as 95% or 99%, indicates the proportion of key words (in a group of sentences) which are correctly heard by normal-hearing listeners.

Q. How are the speech criteria affected by the fact that people tend to raise their voices in noise?

A. The speech criteria are based on the principle that an adequate communication environment does not necessitate raised voices.

Q. How do the identified continuous equivalent levels relate to the fact that, in everyday life, noise fluctuates and is intermittent in nature?

A. The Levels Document tabulated speech interferences for different combinations of levels and durations to test the limits of certain L_{eq} values under intermittent conditions. It is acknowledged that, given equal L_{eq} values, fluctuating noise may reduce less total speech interference than continuous noise on average. On the other hand, during those times when the higher level noises occur, the speech interference will be greater than its average value.

ACTIVITY INTERFERENCE AND ANNOYANCE

Noise interferes with human activities to varying degrees. Intruding noises can interfere with human activities by distracting attention and by making activities more difficult to perform, especially when concentration is needed. Interference from noise can even make some activities (such as communication or sleep) virtually impossible. Except in the case of speech interference, however, the degree of interference is hard to specify and difficult to relate to the level of noise exposure.

Because people's reactions to time-varying noise differ from moment to moment, and because people's reactions differ in general, protective levels for annoyance and activity interference are determined from data collected from groups of people, rather than from individuals. Fortunately, considerable data from social surveys of community reactions to noise exposure are available for this purpose. Although there are some shortcomings in practically all such data, sufficient agreement exists to allow confident predictions of the noise levels that lead to certain degrees of activity interference and annoyance.

Activity Interference

Social surveys most often have been used to assess community reaction to noise exposure around airports. Table VI shows the percentage of people who reported noise interference with activities among a larger group which was extremely disturbed by aircraft noise.

It is hardly surprising that four of the nine activities in Table VI involve listening. Aircraft noise may also be found annoying because it may startle people, cause houses to shake, or elicit fear of a crash.

Another widely studied source of community noise exposure is vehicular traffic. Activity interference produced by traffic noise closely resembles that of aircraft noise, since interference with conversation, radio, television, and telephone use are all high on the list of activities disturbed.

Table VI
Percentage of Those People Who Were Highly Disturbed by Aircraft Noise, by Activity Disturbed

ACTIVITY	PERCENT
TV-Radio Reception	20.6
Conversation	14.5
Telephone	13.8
Relaxing Outside	12.5
Relaxing Inside	10.7
Listening to Records/Tapes	9.1
Sleep	7.7
Reading	6.3
Eating	3.5

Community Reactions to Noise

Two major indices of the cumulative effects of environmental noise on people are (A) specific actions taken by individuals or groups (such as complaints), and (B) responses to social survey questionnaires. Over the last 25 years, numerous studies have been conducted to increase understanding of the relationship between noise exposure and its effects on people in communities.

Several factors beyond the magnitude of exposure have been found to influence community reaction. These factors include:

1. Duration of intruding noises and frequency of occurrence
2. Time of year (windows open or closed)
3. Time of day of noise exposure
4. Outdoor noise level in community when intruding noises are not present
5. History of prior exposure to the noise source
6. Attitude toward the noise source
7. Presence of pure tones or impulses.

Since each of these factors may affect community reactions to noise exposure, adjustments for each have been developed to improve the predictability of community reactions beyond that available from a simple measure of exposure level. Figure 11 shows the results of several different case studies, relating L_{dn} (in dB) to community response with various correction factors added. The addition of the correction factors makes it possible to predict community reaction to within $\pm$ 5 dB. As is common with annoyance and interference caused by noise, the effects of context and situation may be almost as important as the magnitude or intensity of the source. Caution is also needed in applying these relationships to communities that are significantly quieter than average urban areas.

Social Surveys

Extensive social surveys have been conducted around Heathrow Airport near London and at eight major airports in the United States. The relationship found in these surveys between noise exposure levels and the percentage of respondents who were considered annoyed by noise is summarized in Figure 12.

Discussion

Q. Is annoyance simply a "welfare" effect?

A. Annoyance is a reflection of adverse effects which cannot be ascribed solely to "health" or "welfare." "Public health and welfare" in the context of the Noise Control Act is an indivisible term; there are no separate "health" effects or "welfare" effects. "Public health and welfare" includes personal comfort and well-being, and the absence of mental anguish, disturbances and annoyance as well as the absence of clinical symptoms such as hearing loss or demonstrable physiological injury.

Q. What is annoyance due to noise?

A. Noise annoyance may be viewed as any negative subjective reaction to noise on the part of an individual or group. It is not an indication of weakness or inability to cope with stress on the part of the annoyed. More likely it signifies transient (or possibly lasting) stress beyond the control of the conscious individual. This is often expressed on social surveys as the percentage of people who express differing degrees of disturbance or dissatisfaction due to the noisiness of their environments. For the purpose of identifying protective noise levels, annoyance is quantified by using the percentage of people who are annoyed by noise. This is felt to be the best estimate of the average general adverse response of people, and in turn, is viewed as reflecting activity interference and the overall desire for quiet.

Q. Are people annoyed at levels below an L_{dn} of 45 or 55 dB?

A. Individuals, or even groups, may be annoyed by noise at low levels—the dripping faucet or humming flourescent bulb are good examples. Annoyance depends very much on the situation, and on individual differences and noise durations.

Q. What do complaints represent?

A. Complaints are used by officials as an indication that a noise problem exists (although a noise problem may well exist in the absence of specific complaints). However, they do not necessarily represent the magnitude of a noise problem. The number of people who file complaints is only a very small percentage of those who are annoyed.

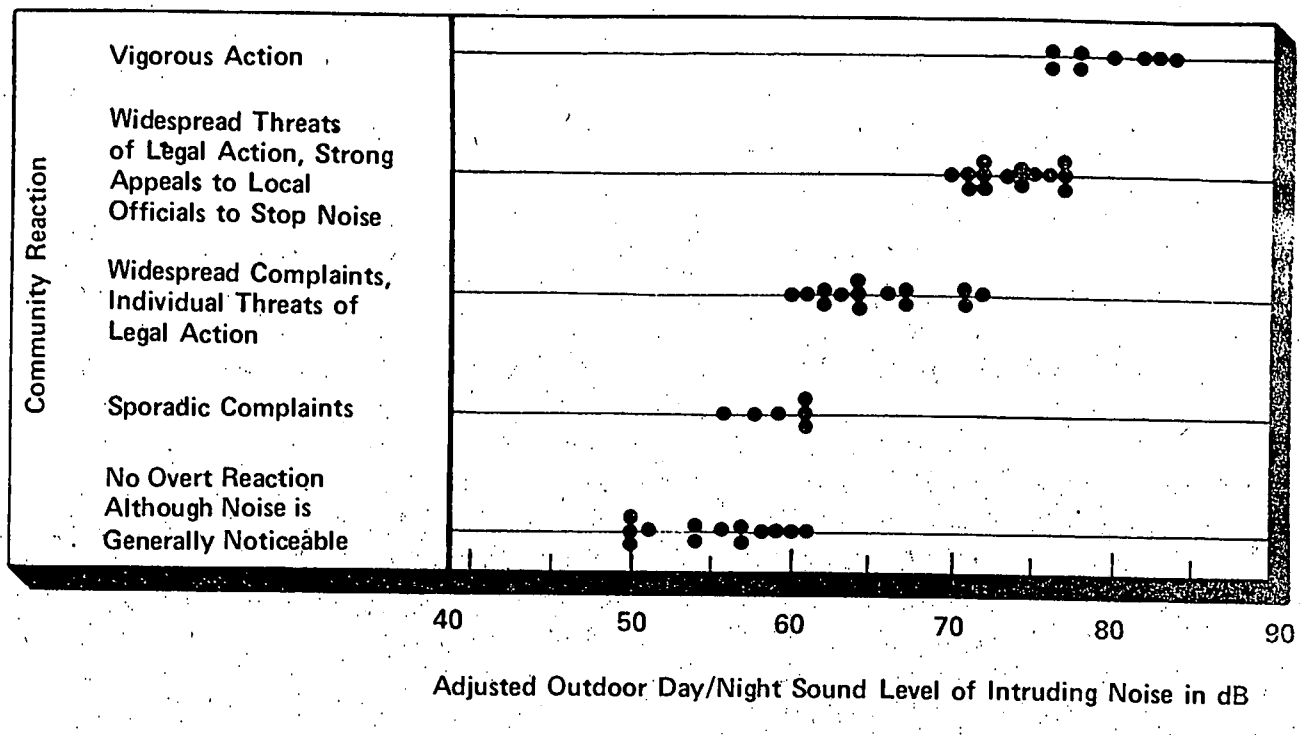

FIGURE 11. COMBINED DATA FROM COMMUNITY CASE STUDIES ADJUSTED FOR CONDITIONS OF EXPOSURE

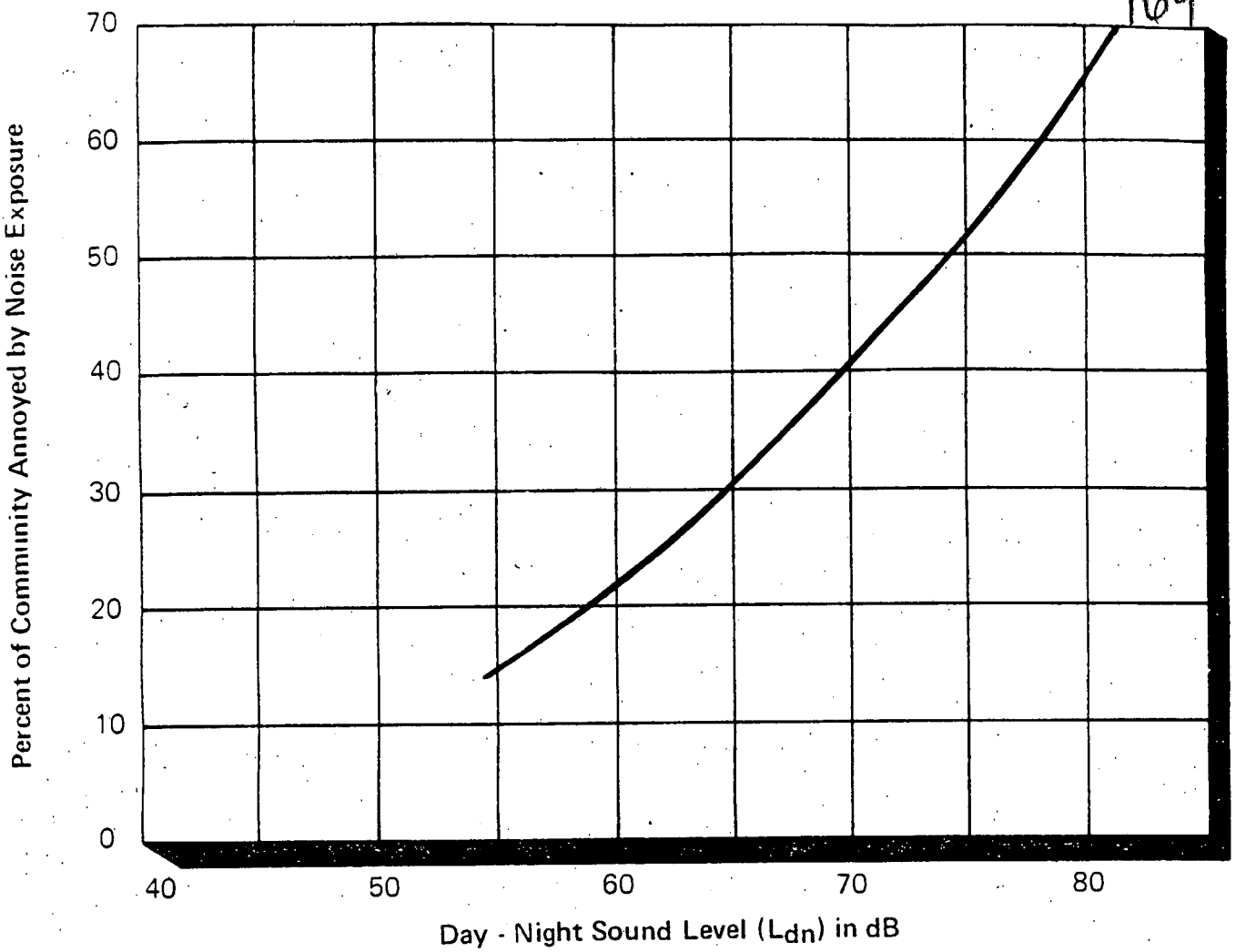

FIGURE 12. PERCENTAGE OF POPULATION ANNOYED BY COMMUNITY NOISE (HEATHROW AIRPORT STUDY)

Q. How is the margin of safety for annoyance applied?
A. The identified indoor level of L_{dn} = 45 incorporates a margin of safety for 100% protection of speech perception which is used as a surrogate for annoyance. The outdoor identified level of 55 L_{dn} protects speech outdoors to a level of 95% intelligibility at up to 2 meters, while incorporating a 5 dB margin of safety for speech, and giving added weight to the range of adverse effects.
Q. Why is the nighttime penalty 10 decibels?
A. The 10 dB nighttime weighting had two bases: first, this weighting value has been applied successfully here and in other countries; secondly, in quiet environments, the natural drop in level from day to night is about 10 dB.

SUMMARY

On the basis of its interpretation of available scientific information, EPA has identified a range of yearly Day-Night Sound Levels sufficient to protect public health and welfare from the effects of environmental noise. It is very important that these noise levels, summarized in Table VIII, not be misconstrued. Since the protective levels were derived without concern for technical or economic feasibility, and contain a margin of safety to insure their protective value, they must not be viewed as standards, criteria, regulations, or goals. Rather, they should be viewed as levels below which there is no reason to suspect that the general population will be at risk from any of the identified effects of noise.

Table VIII
Yearly L_{dn} Values That Protect Public Health and Welfare with a Margin of Safety

EFFECT	LEVEL	AREA
Hearing	$L_{eq(24)} \leq 70$ dB	All areas (at the ear)
Outdoor activity interference and annoyance	$L_{dn} \leq 55$ dB	Outdoors in residential areas and farms and other outdoor areas where people spend widely varying amounts of time and other places in which quiet is a basis for use.
	$L_{eq(24)} \leq 55$ dB	Outdoor areas where people spend limited amounts of time, such as school yards, playgrounds, etc.
Indoor activity interference and annoyance	$L_{dn} \leq 45$ dB	Indoor residential areas
	$L_{eq(24)} \leq 45$ dB	Other indoor areas with human activities such as schools, etc.

Outdoor yearly levels on the L_{dn} scale are sufficient to protect public health and welfare if they do not exceed 55 dB in sensitive areas (residences, schools, and hospitals). Inside buildings, yearly levels on the L_{dn} scale are sufficient to protect public health and welfare if they do not exceed 45 dB. Maintaining 55 L_{dn} outdoors should ensure adequate protection for indoor living. To protect against hearing damage, one's 24-hour noise exposure at the ear should not exceed 70 dB.

MISUSES, MISUNDERSTANDINGS, AND QUESTIONS

Perhaps the most fundamental misuse of the Levels Document is treatment of the identified levels as regulatory goals. They are *not* regulatory goals; they are levels defined by a negotiated scientific consensus. These levels were developed without concern for economic and technological feasibility, are intentionally conservative to protect the most sensitive portion of the American population, and include an additional margin of safety. In short, the levels in Table VIII are neither more nor less than what Congress re

quired them to be: levels of environmental noise requisite to protect the public health and welfare with an adequate margin of safety.

Q. Why doesn't the Levels Document explicity say how much noise is too much noise?

A. Decisions about how much noise is too much noise for whom, for how long, and under what conditions demand consideration of economic, political, and technological matters far beyond the intent of the Levels Document. Such decisions are properly embodied in formal regulations, not informational publications such as the Levels Document.

Q. How do I use this information for local purposes?

A. This question reflects the need to reconcile local economic and political realities with scientific information. People who formulate local noise abatement programs cannot escape the responsibility of making such economic and political compromises for their constituencies. The Levels Document does not impose arbitrary Federal decisions about the appropriateness of noise environments upon any level of government, nor is it a source of prescriptions for solving local noise problems. It is best viewed as a technical aid to local decision makers who seek to balance scientific information about effects of noise on people with other considerations, such as cost and technical feasibility.

Q. If the identified noise levels are indeed sufficient to protect public health and welfare, shouldn't they be considered to be long-range regulatory goals?

A. Attainment of the identified levels of environmental noise can only be considered idealized goals. Pragmatically, it is unlikely that local, state, or Federal regulatory strategies will seek to attain such levels for all situations in the near future.

Q. Why isn't the Levels Document more definite about specific effects associated with various noise exposure conditions?

A. Available knowledge about the effects of noise would not support more precise statements. Increasingly specific statements will be incorporated in future informational publications as they are justified by increasing knowledge of human response to noise exposure.

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TECHNICAL REPORT DATA

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16. ABSTRACT

This publication is intended to promote understanding of EPA's findings about levels of environmental noise that protect public health and welfare. It seeks to clarify the proper use of the 1974 "Levels Document" by interpreting its contents in less technical terms. The manual deals with measurement descriptors of environmental noise. Also addressed are the best understood effects of noise on people (hearing damage, speech interference and annoyance). Protective levels are summarized.

17. KEY WORDS AND DOCUMENT ANALYSIS

a. DESCRIPTORS	b. IDENTIFIERS/OPEN ENDED TERMS	c. COSATI Field/Group
Environmental noise levels, indoor and outdoor levels, measurement descriptors, noise exposure patterns, hearing damage, speech interference, annoyance, protective noise exposures		

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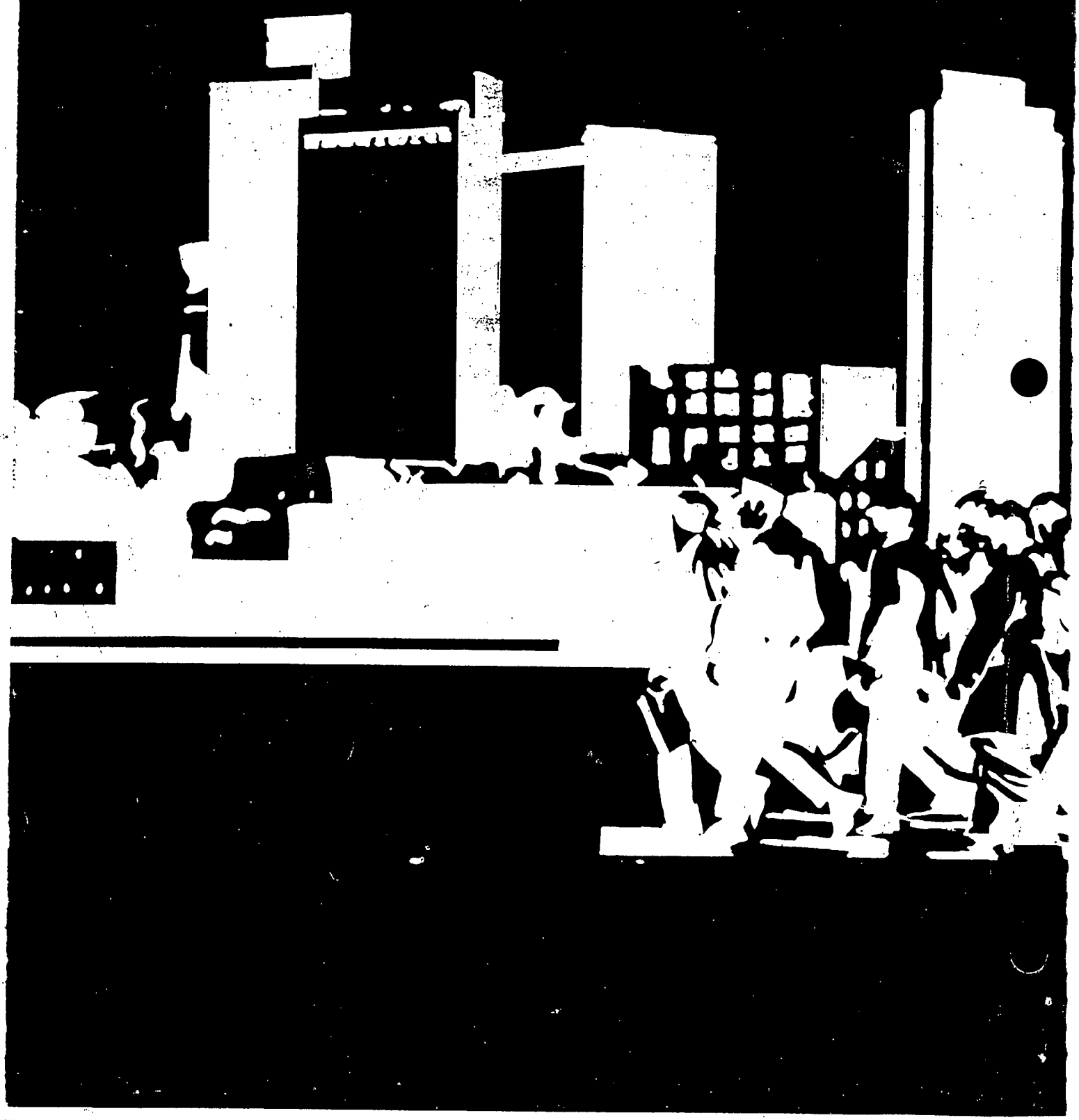

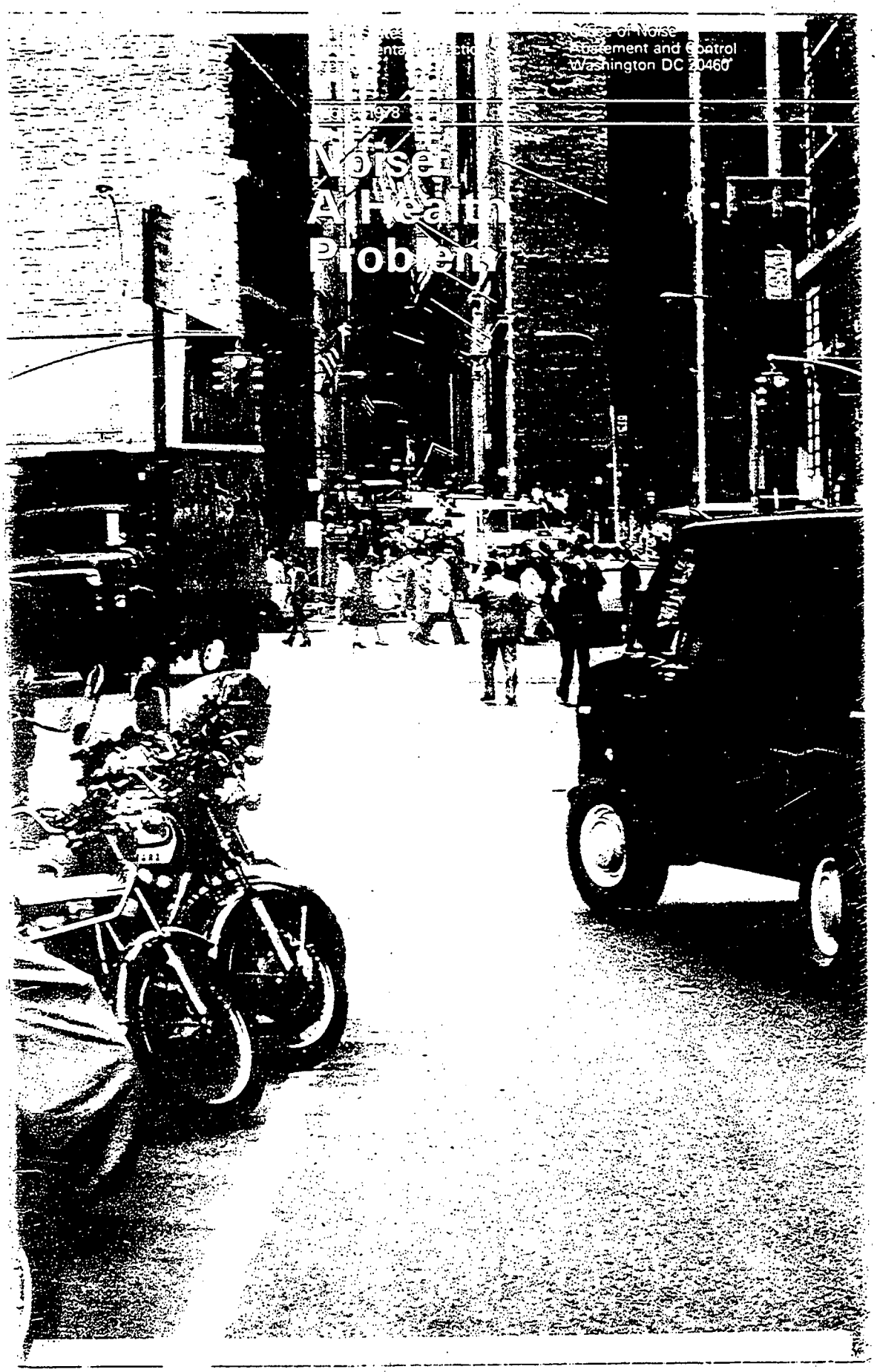
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Problem

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Noise: A Health Problem

"Deafness, like poverty, stunts and deadens its victims." Helen Keller

Hearing Loss

Noise loud enough to cause hearing loss is virtually everywhere today. Our jobs, our entertainment and recreation, and our neighborhoods and homes are filled with potentially harmful levels of noise. It is no wonder then that 20 million or more Americans are estimated to be exposed daily to noise that is permanently damaging to their hearing.

When hearing loss occurs, it is in most cases gradual, becoming worse with time. The first awareness of the damage usually begins with the loss of occasional words in general conversation and with difficulty understanding speech heard on the telephone. Unfortunately, this recognition comes too late to recover what is lost. By then, the ability to hear the high frequency sounds of, for example, a flute or piccolo or even the soft rustling of leaves will have been permanently diminished. As hearing damage continues, it can become quite significant and handicapping. And there is no cure. Hearing aids do not restore noise-damaged hearing, although they can be of limited help to some people.

People with partial deafness from exposure to noise do not necessarily live in a quieter world. The many sounds still audible to them are distorted in loudness, pitch, apparent location, or clarity. Consonants of speech, especially high frequency sounds such as "s" and "ch," are often lost or indistinguishable from other sounds. Speech frequently seems garbled, sounding as if the speaker has his or her "head in a barrel." When exposed to a very loud noise, people with partial hearing loss may experience discomfort and pain. They also frequently suffer from tinnitus — irritating ringing or roaring in the head.

There is even further pain the hard-of-hearing person faces: the emotional anguish caused, perhaps unintentionally, by friends and associates who become less willing to be partners in conversation or companions in other activities. Indeed, the inability to con-

verse normally makes it difficult for partially deaf people to participate in lectures, meetings, parties, and other public gatherings. For a person with hearing loss, listening to TV, radio, and the telephone — important activities of our lives — is difficult, if not impossible.

As hearing diminishes, a severe sense of isolation can set in. The greater the hearing loss, the stronger the sense of being cut off from the rest of the world. What eventually may be lost is the ability to hear enough of the incidental sounds that maintain our feeling of being part of a living world. The emotional depression following such hearing loss is much the same, whether the impairment has been sudden or gradual.

The idea that hearing loss is solely the result of industrial noise is dangerously erroneous. Noise levels in many places and in some of the transportation vehicles we use are well above the levels believed to cause hearing damage over prolonged periods. As a rule, whenever we need to raise our voices to be heard, the background noise may be too loud and should be avoided.

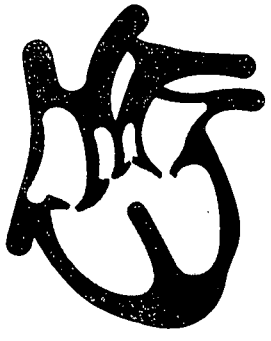
Noise can cause permanent hearing damage

People with hearing loss suffer discomfort and social isolation

Hearing loss is not solely an occupational hazard

"We now have millions with heart disease, high blood pressure, and emotional illness who need protection from the additional stress of noise." Dr. Samuel Rosen, Mt. Sinai Hospital

Heart Disease



While no one has yet shown that noise inflicts any measurable damage to the heart itself, a growing body of evidence strongly suggests a link between exposure to noise and the development and aggravation of a number of heart disease problems. The explanation? Noise causes stress and the body reacts with increased adrenaline, changes in heart rate, and elevated blood pressure.

Noise, however, is only one of several environmental causes of stress. For this reason, researchers cannot say with confidence that noise alone caused the heart and circulatory problems they have observed. What they can point to is a statistical relationship apparent in several field and laboratory studies.

The best available studies are those that have been conducted in industrial settings. For example, steel workers and machine shop operators laboring under the stress of high noise levels had a higher incidence of circulatory problems than did workers in quiet industries. A German study has documented a higher rate of heart disease in noisy industries. In Sweden, several researchers have noted more cases of high blood pressure among workers exposed to high levels of noise.

Some laboratory tests have produced observable physical changes. In one instance, rabbits exposed for 10 weeks to noise levels common to very noisy industries developed a much higher level of blood cholesterol than did unexposed rabbits on the same diet.

Similarly, a monkey subjected to a day-long tape recording of the normal street noises outside a hospital developed higher blood pressure and an increased heart rate. In a test on humans, people subjected to moderately loud noise during different states of sleep exhibited constriction of the outer blood vessels.

Among the more serious recent findings in settings other than the laboratory or industry is the preliminary conclusion that

grade school children exposed to aircraft noise in school and at home had higher blood pressures than children in quieter areas. The exact implications for these children's health are not known, but certainly this finding is cause for serious concern.

Because the danger of stress from noise is greater for those already suffering from heart disease, physicians frequently take measures to reduce the noise exposure of their patients. For instance, a town in New Jersey moved a firehouse siren away from the home of a boy with congenital heart disease when his doctor warned that the sound of the siren could cause the boy to have a fatal spasm. Another doctor ordered a silencing device for the phone of a recuperating heart patient.

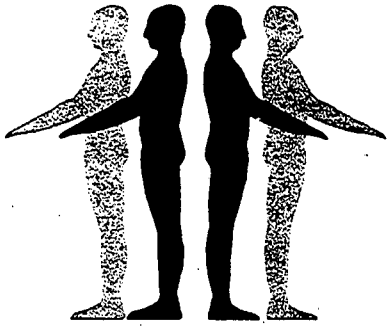
As William Stewart, former Surgeon General of the United States, has pointed out, there are many incidents of heart disease occuring daily in the U.S. for which "the noise of twentieth century living is a major contributory cause." While the precise role of noise in causing or aggravating heart disease remains unclear, the illness is such a problem in our society that even a small increase in the percentage of heart problems caused by noise could prove debilitating to many thousands of Americans.

Noise may produce high blood pressure, faster heart rates, and increased adrenaline

Noise may contribute to heart and circulatory disease

"Loud noises once in a while probably cause no harm. But chronic noise situations must be pathological. Constant exposure to noise is negative to your health."
Dr. Gerd Jansen, Ruhr University

The Body's Other Reactions



In readiness for dangerous and harmful situations, our bodies make automatic and unconscious responses to sudden or loud sounds. Of course, most noise in our modern society does not signify such danger. However, our bodies still react as if these sounds were always a threat or warning.

In effect, the body shifts gears. Blood pressure rises, heart rate and breathing speed up, muscles tense, hormones are released into the bloodstream, and perspiration appears. These changes occur even during sleep.

The idea that people get used to noise is a myth. Even when we think we have become accustomed to noise, biological changes still take place inside us, preparing us for physical activity if necessary.

Noise does not have to be loud to bring on these responses. Noise below the levels usually associated with hearing damage can cause regular and predictable changes in the body.

What happens to the human body when confronted with ever-present noise? In a world where steady bombardment of noise is the rule rather than the exception, the cumulative effects of noise on our bodies may be quite extensive. It may be that our bodies are kept in a near-constant condition of agitation. Researchers debate whether the body's automatic responses build on each other, leading to what are called the "diseases of adaptation." These diseases of stress include ulcers, asthma, high blood pressure, headaches, and colitis.

In studies dating back to the

1930s, researchers noted that workers chronically exposed to noise developed marked digestive changes which were thought to lead to ulcers. Cases of ulcers in certain noisy industries have been found to be up to five times as numerous as what normally would be expected.

Similar research has identified more clearly the contribution of noise to other physical disorders. A five-year study of two manufacturing firms in the United States found that workers in noisy plant areas showed greater numbers of diagnosed medical problems, including respiratory ailments, than did workers in quieter areas of the plants.

From a study done with animals, researchers concluded that noise may be a risk factor in lowering people's resistance to disease and infection.

To prevent aggravation of existing disease, doctors and health researchers agree that there is an absolute requirement for rest and relaxation at regular intervals to maintain adequate mental and physical health. Constant exposure to stress from noise frustrates this requirement. In doing so, it has a potentially harmful effect on our health and well-being.

Noise can cause regular and predictable stress in the human body

People do not get used to noise — the body continues to react

Noise may aggravate existing disease

"There is ample evidence that environment has a role in shaping the physique, behavior and function of animals, including man, from conception and not merely from birth. The fetus is capable of perceiving sounds and responding to them by motor activity and cardiac rate change."
Lester W. Sontag, The Fels Research Institute

Noise and the Unborn

While still in its mother's womb, the developing child is responsive to sounds in the mother's environment. Particularly loud noises have been shown to stimulate the fetus directly, causing changes in heartrate. Related work also has demonstrated that, late in pregnancy, the fetus can respond to noise with bodily movements such as kicking.

Just as the fetus is not completely protected from environmental noise, the fetus is not fully protected from its mother's response to stress, whether it be caused by noise or other factors. When her body reacts to noise, the physical changes she experiences may be transmitted to the fetus. And it is known that the fetus is capable of responding to some changes in the mother's body of the type produced by emotion, noise, or other forms of stress.

In contrast to the more direct risk, this indirect fetal response may threaten fetal development if it occurs early in pregnancy. The most important period is about 14 to 60 days after conception. During this time, important developments in the central nervous system and vital organs are taking place. Unfortunately, women are often unaware that they are pregnant for much of this period, and are thus unlikely to take extra precautions.

While very little research has addressed these questions, due to the difficulties of studying humans in this respect, certain suggestive human research has been done.

A Japanese study of over 1,000 births produced evidence of a high proportion of low-weight babies in noisy areas. These birth weights were under 5½ pounds, the World Health Organization's

definitionof prematurity. Low birth weights and noise were also associated with lower levels of certain hormones thought to affect fetal growth and to be a good indicator of protein production. The difference between the hormone levels of pregnant mothers in noisy versus quiet areas increased as birth approached.

Studies have also shown that stress causes constriction of the uterine blood vessels which supply nutrients and oxygen to the developing baby. Additional links between noise and birth defects have been noted in a recent preliminary study on people living near a major airport. The abnormalities suggested included harelips, cleft palates, and defects in the spine.

Taken together, this information points to the possibility of serious effects of noise on the growth and development of the unborn child. While it cannot be said at what level maternal exposures to industrial and environmental noise are dangerous to the fetus, these findings do create some concern. It is known that extreme stress of any type will certainly take a toll on the fetus, but, in the case of noise, it is not known how much is required to have an effect. Whatever the effect, the risk of even a slight increase in birth defects is considerably disturbing.

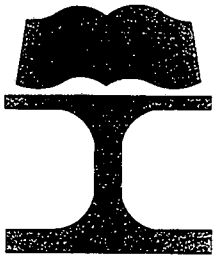
The fetus is not fully protected from noise

Noise may threaten fetal development

Noise has been linked to low birth weights

"Levels of noise which do not interfere with the perception of speech by adults may interfere significantly with the perception of speech by children as well as with the acquisition of speech, language, and language-related skills." National Academy of Sciences Report

Special Effects on Children



Good health includes the ability to function mentally as well as physically. This is especially true during growth and development.

Adults have worried about the effects of noise on children ever since the early 1900s when "quiet zones" were established around many of the nation's schools. These protective areas were intended to increase educational efficiency by reducing the various levels of noise that were believed to interfere with children's learning and even hamper their thinking ability.

Today's worries are little changed from those of the past. Researchers looking into the consequences of bringing up children in this less-than-quiet world have discovered that learning difficulties are likely byproducts of the noisy schools, play areas, and homes in which our children grow up. Two primary concerns are with language development and reading ability.

Because they are just learning, children have more difficulty understanding language in the presence of noise than adults do. As a result, if children learn to speak and listen in a noisy environment, they may have great difficulty in developing such essential skills as distinguishing the sounds of speech. For example, against a background of noise, a child may confuse the sound of "v" in "very" with the "b" in "berry" and may not learn to tell them apart. Another symptom of this problem is the tendency to distort speech by dropping parts of words, especially their endings.

Reading ability also may be seriously impaired by noise. A study of reading scores of 54 youngsters, grades two through five, indicated that the noise levels in their four adjacent apartment buildings were detrimental to the children's reading development. The influence of noise in the home was found to be more important than even the

parents' educational background, the number of children in the family, and the grades the youngsters were in. The longer the children had lived in the noisy environment, the more pronounced the reading impairment.

Assuming a child arrives at school with language skills underdeveloped because of a noisy home, will he or she fare any better at school? Again, the answer may depend on how noisy the classroom is. In a school located next to an elevated railway, students whose classrooms faced the track did significantly worse on reading tests than did similar students whose classrooms were farther away. In Inglewood, California, the effects of aircraft noise on learning were so severe that several new and quieter schools had to be built. As a school official explained, the disruption of learning went beyond the time wasted waiting for noisy aircraft to pass over. Considerable time had to be spent after each flyover re-focusing students' attention on what was being done before the interruption.

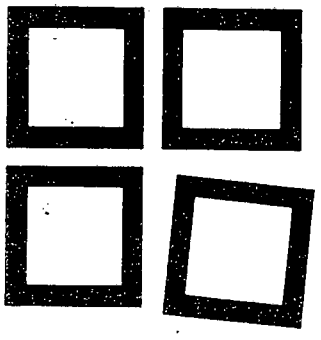
But the problem may be well beyond the capacity of the schools to correct. Children who live in noisy homes and play in noisy areas may never develop the ability to listen well enough to learn once they are of school age. To avoid this prospect, our concern for the health and welfare of the nation's children must be broadened to address the total environment in which they grow up.

Noise may hinder the development of language skills in children

Noise disrupts the educational process

"Interference with speech communication by noise is among the most significant adverse effects of noise on people. Free and easy speech communication is probably essential for full development of individuals and social relations, and freedom of speech is but an empty phrase if one cannot be heard or understood because of noise." EPA Report

Intrusion At Home and Work



If there is one common denominator degrading the quality of all our lives, it may well be the almost constant intrusion of noise — in the home, at work, and in public areas. One of the most bothersome aspects of this intrusion is its interference with conversation. We may not always be aware of it, but we frequently must speak up to be heard. Others must often do the same to be understood by us.

Loss of the ability to speak at a normal level and be heard may be far more damaging than we realize. People who live in noisy places tend to adopt a lifestyle devoid of communication and social interaction. They stop talking, they change the content of the conversation, they talk only when absolutely necessary, and they frequently must repeat themselves. These reactions are probably familiar to all of us.

Interference with indoor conversation represents only a small part of the intrusion problem. Outdoors, the combination of continuous daytime noise caused by street traffic, construction equipment, and aircraft interrupts speech and can discourage conversation there as well. For millions of Americans residing in noisy urban areas, the use of outdoor areas for relaxed conversation is virtually impossible.

Noise not only makes conversation difficult — indoors or out — it also seems to hinder work efficiency. In general, noise is more likely to reduce the accuracy of work rather than the total quantity. And it takes a greater toll on complex compared to simpler tasks. When noise is particularly loud or unpredictable, errors in people's observation tend to increase, perception of time may be distorted, and greater effort is required to remain alert. Loud noise also can increase the

variability of work, leading to breaks in concentration sometimes followed by changes in work rate.

Even when noise does not interfere with the work at hand, work quality may suffer after the noise stops. Studies and reports from individuals also suggest that people who work in the midst of high noise levels during the day are more, rather than less, susceptible to frustration and aggravation after work. Relaxing at home after a noisy workday may not be an easy thing to do. When the home is noisy itself, the tired and irritated worker may never be able to work out the day's accumulated stress during the course of the evening.

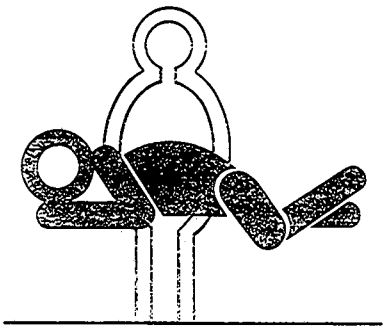
Noise in industrial settings may have the most pronounced effects on human performance and employee health. A coal industry study indicated that intermittent noise conditions during mining have a great likelihood for causing distraction leading to poorer work. Other studies have confirmed additional effects of noise exposure, including exhaustion, absentmindedness, mental strain, and absenteeism — all of which affect worker efficiency. In the words of Leonard Woodcock, former president of the United Auto Workers, "They (auto workers) find themselves unusually fatigued at the end of the day compared to their fellow workers who are not exposed to much noise. They complain of headaches and inability to sleep and they suffer from anxiety . . . Our members tell us that the continuous exposure to high levels of noise makes them tense, irritable, and upset."

Noise interferes with conversation and social interaction

Noise hampers work efficiency

"The din of the modern city [includes] noises far above levels for optimum sleeping. Result: insomnia and instability."
Dr. Edward F. Crippen, Former Deputy Health Commissioner of Detroit

Sleep Disruption



Sleep is a restorative time of life, and a good night's sleep is probably crucial to good health. But everyday experience suggests that noise interferes with our sleep — in a number of ways. Noise can make it difficult to fall asleep, it can wake us, and it can cause shifts from deeper to lighter sleep stages. If the noise interference with sleep becomes a chronic problem, it may take its toll on health.

Human response to noise before and during sleep varies widely among age groups. The elderly and the sick are particularly sensitive to disruptive noise. Compared to young people, the elderly are more easily awakened by noise and, once awake, have more difficulty returning to sleep. As a group, the elderly require special protection from the noises that interfere with their sleep.

Other age groups seem to be less affected by noise at bedtime and while asleep. But their apparent adjustment may simply be the result of failing to remember having awakened during the night. Sleep researchers have observed that their subjects often forget and underestimate the number of times they awaken during sleep. It may be that loud noises during the night continue to wake or rouse us when we sleep, but that as we become familiar with the sounds, we return to sleep more rapidly.

Factors other than age can influence our sleep. Studies suggest that the more frequent noise is, the less likely a sleeper is to respond. Certain kinds of

noises can cause almost certain responses, however. A mother may wake immediately at the sound of a crying baby, but may tune out much louder traffic noise outside.

Disruption of sleep does not necessarily include awakening. Shifting in depths of sleep may be more frequent than awakening. For instance, recent studies have shown that shifts from deep to light sleep were more numerous because of noise, and that light sleep became lengthened at the expense of deep sleep.

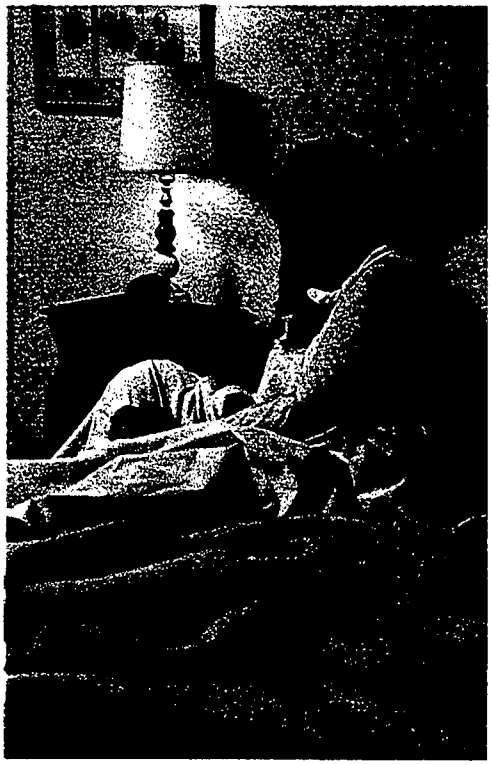
Studies have also been made of noise complaints and what kinds of annoyance led people to file them. Surveys taken in communities significantly affected by noise indicated that the interruption of rest, relaxation, and sleep was the underlying cause of many people's complaints.

When noise interferes with our sleep— whether by waking us or changing the depth of sleep — it makes demands on our bodies to adapt. The implications of these demands for our general health and performance are not well understood. Nonetheless, we need restful sleep and many of us are not getting it. As a result, for millions of Americans, trying to get a good night's sleep still means reaching for sleeping pills.

Noise affects the quantity and quality of sleep

The elderly and sick are more sensitive to disruptive noise

When sleep is disturbed by noise, work efficiency and health may suffer



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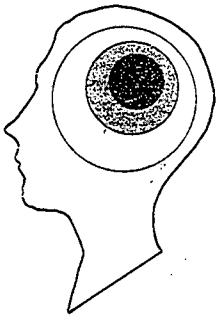
"The Noise, The Noise. I just couldn't stand the Noise."
Suicide note left by a desperate homeowner.

Mental and Social Well-Being



The most obvious price we pay for living in an overly noisy world is the annoyance we frequently experience. Perhaps because annoyance is so commonplace, we tend to take our daily doses of it for granted — not realizing that the irritability that sometimes surfaces can be a symptom of potentially more serious distress inside us. When noise becomes sufficiently loud or unpredictable, or if the stress imposed is great enough, our initial annoyance can become transformed into more extreme emotional responses and behavior. When this happens, our tempers flare and we may "fly off the handle" at the slightest provocation.

Newspaper files and police records contain reports of incidents that point to noise as a trigger of extreme behavior. For instance, a night clerical worker, upset about noise outside his apartment, shot one of the boys causing the disturbance after he had shouted at them, to no avail, to "Stop the noise." As other examples, sanitation workers have been assaulted, construction foremen threatened, and motorboat operators shot at — all because of the noise they were producing.

Such extreme actions are not the usual responses to noise and stress. Some people cope with loud noise by directing their anger and frustration inward, by blaming themselves for being upset, and by suffering in silence. Others resort to a denial of the problem altogether, considering themselves so tough that noise does not bother them. Still others deal with noise in a more direct manner: they take sleeping pills and wear ear plugs, increase their visits to doctors and keep their windows closed, rearrange their sleeping quarters and spend less time outdoors, and write letters of complaint to government officials.

Most of the time these ways of contending with noise are not likely to eliminate the noise or any underlying annoyance. Short of taking extreme action — which is unlikely to solve the problem

either — most people who cannot cope with noise in these ways typically direct their anger and frustration at others and become more argumentative and moody, though not necessarily violent. This noise-induced, anti-social behavior may be far more prevalent than we realize.

Indeed, noise can strain relations between individuals, cause people to be less tolerant of frustration and ambiguity, and make people less willing to help others. One recent study, for example, found that, while a lawnmower was running nearby, people were less willing to help a person with a broken arm pick up a dropped armload of books. Another study of two groups of people playing a game found that the subjects playing under noisier conditions perceived their fellow players as more disagreeable, disorganized, and threatening. Several industrial studies indicate that noise can heighten social conflicts both at work and at home. And reports from individuals suggest that noise increases tensions between workers and their supervisors, resulting in additional grievances against the employer.

Although no one would say that noise by itself brings on mental illness, there is evidence that noise-related stress can aggravate already existing emotional disorders. Research in the United States and England points to higher rates of admission to psychiatric hospitals among people living close to airports. And studies of several industries show that prolonged noise exposure may lead to a larger number of psychological problems among workers.

Noise can cause extreme emotions and behavior

Anti-social behavior caused by noise may be more prevalent than is realized

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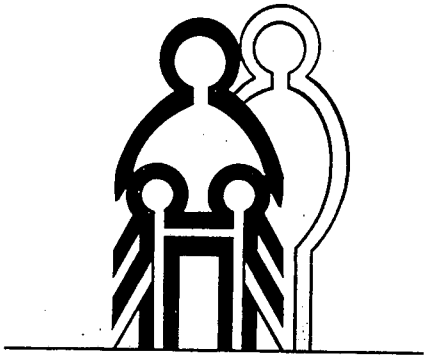
"Inability to hear auditory warning signals or shouts of caution because of noise has also been implicated in industrial accidents." Alexander Cohen, National Institute for Occupational Safety and Health

Danger to Life and Limb



Two people were killed when Senator Robert Kennedy's funeral train passed through Elizabeth, New Jersey. Because of the noise from Secret Service and news media helicopters, they did not hear the warning blasts from the train that hit them.

Although the evidence is scanty, the inability to hear warning signals because of high background noise is thought to be the cause of many accidents each year. For example, traffic accidents occur and lives are lost because drivers are unable to hear the sirens from nearby or passing emergency vehicles. One study has estimated that when a fire truck or ambulance is in the process of passing a truck, the truck driver is able to detect the siren for only a very short time — three seconds or less. The rest of the time the truck's noise drowns out the siren, and the warning is undetected.

Nowhere is the concern over preventable accidents greater than in industrial settings, where noise levels not only can interfere with concentration and can cause hearing loss, but can hinder communication between employees as well — particularly in times of emergency. A study of medical and accident records of workers in several industries found that a significantly higher number of reported accidents occurred in noisier plant areas. The Federal Railroad Administration is aware of this hazard and has identified "high noise-level conditions" as a possible contributor in 19 accidents causing deaths of 25 railroad employees, in a 22-month period.

Reports from industrial officials also indicate that the effectiveness of warning signals and shouts in noisy areas is considerably diminished and that accidents and injuries are more fre-

quent. The effects of masking and speech interference can be dramatic, as in the case of an accident in an auto glass manufacturing plant. Noise levels were so high that a worker whose hand was caught in manufacturing equipment received no aid since no one heard the screams. As a result, the hand was lost. As additional examples, two press-room auto workers in Ohio were permanently disabled when they failed to hear approaching panel racks or warning shouts.

Thus it is an unfortunate result of high background noise levels that people cannot respond in life and death situations when they are unable to hear approaching hazards or shouts of alarm.

Noise can obscure warning signals, causing accidents to occur

Noise can interfere with shouts for help, preventing rescue attempts

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"It is truly a serious problem to escape from noise."
William Dean Howells, American Author

A Final Word

When unwanted sounds intrude into our environment, noise exists. We have all experienced to varying degrees the annoyance and irritation caused by noise. Sometimes this annoyance is brought about by disruption of our sleep or difficulty in falling asleep. At other times, it may be because we have to raise our voices over background noise to be heard or because we are distracted from our activities.

Except for the serious problem of hearing loss, there is no human illness known to be directly caused by noise. But throughout dozens of studies, noise has been clearly identified as an important cause of physical and psychological stress, and stress has been directly linked with many of our most common health problems. Thus, noise can be associated with many of these disabilities and diseases, which include heart disease, high blood pressure, headaches, fatigue and irritability.

Noise is also suspected to interfere with children's learning and with normal development of the unborn child. Noise is reported to have triggered extremely hostile behavior among persons presumably suffering from emotional illness. It is suspected to lower our resistance, in some cases, to the onset of infection and disease.

However, most Americans are largely unaware that noise poses such significant dangers to their health and welfare. The reasons for this lack of awareness are clear. Noise is one of many environmental causes of stress and cannot easily be identified as the source of a particular physical or mental ailment by the layman. Another reason is that biomedical and behavioral research is only now at the point where health hazards stemming from noise can actually be named, even though some specific links have yet to be found.

Dr. William H. Stewart, former Surgeon General, in his keynote address to the 1969 Conference on Noise as a Public Health Hazard, made the following point: "Must we wait until we prove every link in the chain of causation? I stand firmly with (Surgeon General) Burney's statement of 10 years ago. In protecting health, absolute proof comes late. To wait for it is to invite disaster or to prolong suffering unnecessarily. I submit that those things within man's power to control which impact upon the individual in a negative way, which infringe upon his sense of integrity, and interrupt his pursuit of fulfillment, are hazards to public health."

It is finally clear that noise is a significant hazard to public health. Truly, noise is more than just an annoyance.

While this booklet contains reliable and important information on Noise, it is not published in support of any specific EPA Noise Regulation. The technical supporting documentation for any specific EPA Noise regulation will be published in a background document which accompanies the regulation.

"Calling noise a nuisance is like calling smog an inconvenience. Noise must be considered a hazard to the health of people everywhere."

Dr. William H. Stewart, former U.S. Surgeon General

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NOISE ORDINANCE TASK FORCE

FINAL REPORT

Executive Summary

The Noise Ordinance Task Force was established by the County Executive at the recommendation of the County Council. This was prompted by the number of citizens that voiced concerns about noise problems during the public hearings for the county's commercial and industrial zoning code changes.

The Task Force was established in March and asked to report back to the County Executive by May 15, 2000. The members of the Task Force are: Betty Dixon, Land Use and Environment Office, Chairman; Bill Burlison, County Councilman, District 4; Kathy Buinickas, Aide to Councilman Burlison; Larry Burkins, Current Planning, Department of Planning and Code Enforcement; Sally Iliff, County Office of Law; Capt. Dave Shipley, County Police Department; Bob Weber, Community and Environmental Health, County Department of Health. The group was tasked to examine the scope of the noise problem, identify appropriate changes to the code, enforcement mechanisms and potential costs.

The first meeting of the Task Force was on March 27, and the group met approximately every two weeks through the final meeting held on June 5, 2000. The group began the process by identifying all complaints received within the past year from all sources. We obtained copies of the Maryland Department of the Environment Regulations on Noise Control as well as the Annotated Code of Maryland, Environment, Title 3 on Noise Control.

Two members of the task force attended the Maryland Municipal League's Code Enforcement and Zoning Officials Association Meeting on April 13. The topic of discussion was Community Noise Control Programs. The guest speakers were Dave Jarinko, MDE, Noise Control Programs; George Harman, MDE; and Thomas Ogle, Montgomery County Department of Environmental Protection. There were several local jurisdictions represented at this seminar. As a result of this, we obtained copies of the Noise Ordinances for Montgomery County, Howard County, Ocean City, and The City of Bowie. We also received several booklets that have been published by other jurisdictions that could be modified and used for Anne Arundel County. These materials were circulated to the entire Task Force for review and comment.

While Montgomery County's Noise Ordinance is the most comprehensive, the staffing and equipment available to Montgomery County is far greater than what is anticipated for Anne Arundel County. They have adopted a stricter "quiet hours" policy than the State. Their quiet hours are from 9:00 p.m. to 7:00 a.m. on Weekdays and 9:00 p.m. to 9:00 a.m. on Weekends and Holidays. Their decibel levels are the same as the State limits. However, the majority of their ordinance allows enforcement on a very subjective basis.

The Task Force then reviewed the County's existing noise code. The bulk of these restrictions are found in the Anne Arundel County Code, Article 11, Crimes and Punishment, which are enforced by the Police Department. There are additional references in Article 28, Zoning, as well as under Animal Control, and Recreation and Parks. The Task Force reviewed all of these sections and made recommendations to changes in the Code.

INTRODUCTION

What is Noise? "Noise" means the intensity, frequency, duration, and character of sound. Noise includes sound and vibration of sub-audible frequencies.

What is Noise Pollution? Unwanted sound that is injurious to personal health, or interferes with enjoyment of property or business.

What are Maximum Allowable Noise Levels?

Maximum Allowable Noise Levels (dBA)

Day/Night	*Industrial*	*Commercial*	*Residential*
Day	75	67	65 - (7:00 a.m. - 10:00 p.m.)
Night	75	62	55 - (10:00 p.m. - 7:00 a.m.)

History of State Noise Law. State established noise program in 1957. The Noise Protection Act was passed in 1974 and has been amended in 1982, 1987, 1988, 1991, 1993 and 1997.

Who is Responsible for Enforcing Noise Violations? Maryland Department of the Environment. MDE has **one** noise expert that is responsible for the entire State. This makes response time difficult and requires that investigations will only take place for repetitive, routine noise. A one-time or periodic occurrence is usually not handled by MDE.

Does Anne Arundel County Need a Noise Ordinance? While there has been some public belief that Anne Arundel County needs to enact its own noise ordinance, it is worthwhile to state that the county is already covered by the State's regulations. The difficulty with maintaining this position is that it does not provide quick response to noise complaints, or complaints that are not repetitive in nature.

It is also important to point out that the county already has a residential noise ordinance in the code, which is successfully enforced through our Police Department. While there can be some changes made to the Code that will assist the Police in enforcement, the main problem is lack of public knowledge of the existing laws.

We must take into account budgetary constraints in both staffing capabilities and equipment purchasing and maintenance. The Task Force does feel that we can accomplish our goal through modifications to the existing code, a public awareness/education program, modification to development and subdivision plan review, and notification at the building permit stage on the "quiet hours" in Anne Arundel County. These recommendations will be explained further in the report.

NOISE COMPLAINTS IDENTIFIED

The following organizations contributed input on the types of noise to be addressed by the Task Force:

Davidsonville Area Civic Association (Peter Perry)
Forks of the Patuxent Improvement Association, Inc. (Catherine Fleshman)
Greater Crofton Council (Robert Scott)
Greater Odenton Improvement Association, Inc. (Bert Rice)
Greater Severn Improvement Association (Mike Shylanski)
Greater Severna Park Council (Al Johnston)
Jessup Improvement Association (Lorraine Rohlik)
Linthicum Shipley Improvement Association (Rick Forgo)
Piney Orchard Community Association (Doreen Strothman)
South County Coalition (Peter Perry)

The following list includes those noise complaints identified by these communities:

- Loudspeaker systems at recreational facilities (i.e., ball fields, golf courses, tennis courts, etc.)
- Racetrack noise generated by vehicular and loudspeaker (no muffler systems are currently required and they actually have microphones on the racetrack to make the vehicular sounds louder than they really are)
- Crushers used by asphalt plants and surface mining operations
- Rifle ranges near residential areas such as Fort Meade and State Prisons (does not need to be regulated in RA and OS zoning)

- Recreational vehicles (i.e., ATV - All Terrain Vehicles)

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- Ventilation equipment used in industrial areas
- Aircraft (take-off engine noise and flying too low)
- Lawn mowers and leaf blowers (set time restrictions on their use)
- Train noise generated by engine idling and connecting of rail cars (residential areas)
- Excessive dog barking
- Truck noise generated by the use of jake brakes (In April 2000, a state regulation was promulgated to regulate the amount of noise vehicles can generate through their exhaust system). Need to train our county police to use the equipment associated with enforcing this new regulation.
- Loud music generated from homes, vehicles, concerts, night clubs, and bars (bands playing on piers on rivers where the sound carries across and down the river)
- Vehicular noise generated by backing up warning beepers (this noise can be eliminated during the hours of darkness if the machinery/trucks were equipped with strobe lights instead of beepers. Reliable Contracting in Odenton uses this method of minimizing the noise generated from their facility. Why not make this a mandatory requirement for truck operations which operate during the night?)
- Motor boats
- Light rail noise generated from the movement of the railcars on the tracks (suggest more trees be planted around the tracks to minimize the noise level. The new ordinance should mandate that trees be planted when issuing a permit for the construction of new light rail tracks.
- Railroad maintenance facility (machinery noise)

The above groups requested that hunting and sport shooting (if not located near residential areas) not be regulated. Political subdivisions are expressly prohibited from regulating trap and skeet shooting by State law.

Many of the above-referenced complaints were also identified by the Task Force when asked to provide a listing of the types of complaints received in each of their departments. Many of the complaints on this list are already covered under existing sections of the code. This is an

example where public education of existing laws would assist property owners in identifying the appropriate agency to contact to register a noise or disturbance complaint.

A few of the items on the above list are not regulated under the State's Noise Ordinance. Boats on State waters are exempt from the State Noise Ordinance and are under the jurisdiction of the Department of Natural Resources. Motor vehicle, rapid rail transit and aviation noise are addressed in the State Transportation Code. The County is without jurisdiction to regulate State roads or public aviation facilities. However, there are sections of the Maryland Transportation Article that are enforceable by the County Police Department. These sections are identified in Appendix A.

RECOMMENDATIONS:

1. Develop informational brochure similar to Montgomery County's (attached) that can be distributed countywide.

2. Incorporate plat note reference that all State noise regulations must be complied with (Annotated Code of Maryland, Environment Article, Title 3) as part of the subdivision or commercial development site plan. (*This will put the impetus on the developer's architect/engineer to assure design of facilities takes into account appropriate baffles or other sound attenuation devices).*

3. Site planners/reviewers should take into account placement of air coolers and generators during site plan review process, especially when immediately adjacent to residential properties.

4. Develop a sticker that can be placed on all building permits that states the permitted hours of construction with the appropriate State code reference.

5. Review regulations on loudspeakers at Recreation and Parks ballfields. Change time restriction to 10:00 p.m. to comply with State regulations. (Currently Recreation and Parks continue activities until 11:00 p.m.)

6. Establish a 100-yard boundary rule for operation of dirt bikes.

7. Review all special exception conditions for time limitations.

8. Change "quiet hours" from 10:00 p.m. to 7:00 a.m. to:
   10:00 p.m. to 7:00 a.m. Weekdays
   10:00 p.m. to 8:00 a.m. Weekends and Holidays OR
   9:00 p.m. to 8:00 a.m. Weekdays
   9:00 p.m . to 8:00 a.m. Weekends and Holidays

9. Obtain two (2) noise meters ($3500.00 each) and have two (2) inspectors trained by the State. Establish a Noise Control Officer position from one of the two inspector positions.

Following are the recommendations to changes in the Anne Arundel County Code:

- Article 11, Section 5-105. [Noise in residential districts.] NOISE CONTROL.
- Article 11, Section 5-105(c)(1) A person may not:

(i) no change

(ii) between the hours of [11:00 p.m. and 7:00 a.m.] 10:00 P.M. AND 7:00 A.M. ON WEEKDAYS, AND 10:00 P.M. AND 8:00 A.M. ON WEEKENDS AND HOLIDAYS, use, operate, or permit the use or operation of a musical instrument or a machine, tool, equipment or similar device at an unreasonably loud volume in a residential district; or

(iii) no change

(v) OPERATE/DRIVE A MOTORIZED CONVEYANCE SUCH AS A MINI BIKE, DIRT BIKE, ATV, OR MOTORCYCLE WITHIN 100 YARDS OF A PROPERTY LINE OF A DWELLING WITHOUT POSSESSING THE EXPRESS WRITTEN PERMISSION OF A RESIDENT OF THAT DWELLING.

(2) It is *prima facie* evidence of a violation of paragraph (1) of this subsection (c) if the sound generated/PRODUCED [by the device] can be heard at a distance of 50 feet from the device, OR THE SOURCE OF SOUND.

- Article 28 Zoning Section 12-230 Marine service facilities

(a)(vii)(6) the design of the site affords minimal detrimental impact on adjacent residential areas with respect to building location and height, access, lighting, signs, landscaping, location of water facilities, location of storage areas, and noise AS REQUIRED IN ARTICLE 11, SECTION 5-105.

There are several references throughout Article 28 Zoning that stipulates a stricter "quite hours" of operation than those indicated above. The Task Force does not recommend making any of these changes at this time.

COSTS TO IMPLEMENT:

The costs associated with the implementation of these recommendations would be the two (2) decibel reading instruments at $3500/each and the time associated with training and responding to complaints. These instruments were recommended by the MDE Noise Expert. There would also be some cost associated with the public information brochure as well as the recommended stickers to be applied to each building permit.

SUMMARY

We believe this report has addressed the issues that were identified by the County Executive and the County Council at the time the Task Force was established. We feel that this issue was thoroughly researched by the Task Force and these recommendations will provide the best service to the citizens of Anne Arundel County. We do recognize that some of the issues addressed by the citizens relating to industrial/commercial noise that is within the State regulated decibel levels, and is occurring during the normal operating hours, will not be addressed by these recommended changes. In these instances, it might require some public outreach with the businesses in question to see if there is some type of sound attenuating methods, devices or practices that can be implemented in order to alleviate the disturbance to adjoining residential neighborhoods. The bulk of enforcement on this proposed Noise Control legislation will fall to the Police Department. Since they provide 24-hour response to the citizens of the county, they will remain the first line of response for most complaints. For the other complaints that occur during normal hours of operation, but are believed to exceed the State standards, our inspectors will be able to respond to these situations, take decibel readings, and if the readings exceed the state limits, refer the enforcement to the Maryland Department of the Environment. *For other complaints that occur during normal hours of operation, the Noise Control Officer will respond by referring the complaint to the proper County or State agency and will become the liaison between the complainant and the agency to which referred.*

We respectfully submit this report to the County Executive on 9/6/00.

Signed: Elizabeth L. Dixon

Elizabeth L. Dixon, Chairman

Kathy Buinickas

Kathy Buinickas, County Council Aide

Lawrence E. Burkins, Planning & Zoning

Bill D. Burlison

Bill D. Burlison, County Councilman

Sally M. Iliff

Sally M. Iliff, Office of Law

Capt. David Shipley, Police Department

Robert J. Weber

Robert Weber, Health Department

* Retired

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NPC Noise Pollution Clearinghouse

"Good Neighbors Keep Their Noise to Themselves"

LAW LIBRARY

State Noise Statutes & Regulations

Here you will find state noise-related statutes and regulations.

This site is currently under construction. Currently you can access the noise statutes or noise-related regulations of the following states:

California
Delaware
Hawaii
Maryland
Massachusetts
Minnesota
Missouri
New Jersey
Oregon

State Watercraft Noise Regulations

The table below lists which of the fifty states have comprehensive state-wide noise regulations. The table also shows contact information and if the state ofers a model ordinance and/or support to local governments. This survey was compiled in December of 1997. Explanations of the different columns are listed after the survey.

State Noise Regulation Survey

State	State Reg.	Impulse	Model Ordinance	Support	Contact	Phone
AK	NO	NO	NO	NO	Billie Willson	907-465-5061
AL	NO	NO	NO	NO	Blake Roper	1-800-533-2336
AR	NO	NO	NO	NO	NA	501-682-0744
AZ	NO	NO	NO	YES	Fred Garcia	602-255-8639

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CA	NO	NO	YES	NO	NA	916-445-3846
CO	NO	NO	NO	NO	NA	303-692-3100
CT	YES*	YES	YES	NO	Joe Pulaski	860-424-3373
DC	YES	NA	NO	NO	James Hauser	202-727-7266
DE	YES*	YES	NO	NO	JoAnna Austin	302-739-4791
FL	NO	NO	NO	NO	Don Trussell	904-488-3601
GA	NO	NO	NO	NO	NA	404-656-4713
HI	YES	YES	NO	YES	James Toma	808-586-4700
IA	NO	NO	N0	NO	Christine Spackman	515-281-8969
ID	NO	NO	NO	NO	NA	208-373-0502
IL	YES	YES	YES	YES	Greg Zak	217-785-7726
IN	NO	NO	NO	NO	Tim Method	317-232-8603
KS	NO	NO	NO	NO	Jan Sides	913-296-1593
KY	YES*	NO	YES	NO	Kenith Hienes	502-564-2150
LA	NO	NO	NO	NO	NA	504-765-0741
MA	YES	NO	NO	NO	NA	617-292-5630
MD	YES	YES	YES	YES	Dave Jarinko	410-333-2590
ME	YES	NO	NO	NO	NA	207-287-3261
MI	NO	NO	NO	NO	NO	517-373-7917
MN	YES	NO	YES	YES	Brain Timerson	612-296-7898
MO	NO	NO	NO	NO	NA	573-751-4422
MS	NO	NO	NO	NO	NA	601-961-5100
MT	NO	NO	NO	NO	NA	406-444-4820
NC	NO	NO	NO	NO	Tom Mather	919-715-7408
ND	NO	NO	YES	NO	Jim Killingbeck	701-328-5150
NE	NO	NO	NO	NO	NA	402-471-2186
NH	NO	NO	NO	NO	NA	603-271-1370
NJ	YES	YES	YES	NO	Eric Zwerling	908-932-8065
NM	NO	NO	NO	NO	NA	505-827-2855
NV	NO	NO	NO	NO	NA	702-687-5065
NY	NO	NO	NO	NO	NA	518-457-7230
OH	NO	NO	NO	NO	NA	614-644-3020
OK	NO	NO	NO	NO	NA	405-271-8056
OR	YES*	NA	YES	NO	Linda Wichart	503-229-5388
PA	NO	NO	NO	NO	NA	717-787-4325

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RI	NO	NO	NO	NO	NA	401-277-2771
SC	NO	NO	NO	NO	NA	803-734-4750
SD	NO	NO	NO	NO	Brad Schultz	605-773-3351
TN	NO	NO	NO	NO	NA	615-241-3600
TX	NO	NO	NO	NO	NA	512-239-3900
UT	NO	NO	NO	NO	NA	801-536-4000
VA	NO	NO	NO	NO	NA	804-698-4020
VT	NO	NO	NO	NO	NA	802-241-3600
WA	YES*	NO	NO	NO	Jerry Lenssen	360-470-6703
WI	NO	NO	NO	NO	Penny Kanable	608-264-8892
WV	NO	NO	NO	NO	NA	304-759-0515
WY	NO	NO	NO	NO	Dan Olson	307-777-7391

* State has a noise regulation on the books but does not enforce it.

Impulse = State regulation includes guidelines for impulse noise. Impulse noise is defined as: a) Either a single sound pressure peak (with either a rise time less than 200 milliseconds or total duration less than 200 milliseconds) or multiple sound pressure peaks (with either rise time less than 200 milliseconds or total duration less than 200 milliseconds) spaced at least by 200 millisecond pauses, b) A sharp sound pressure peak occurring in a short interval of time.
State Reg. = State does/does not have a noise regulation on the books.
Model Ordinance = State provides a model noise ordinance for municipalities.
Support = State provides some sort of support and/or training to municipalities enacting a noise ordinance

State Watercraft Noise Regulations

Illinois

Kentucky

Nevada

Oklahoma

Oregon

Pennsylvania

Utah

Virginia